Southern Power & Industry

The Industrial and Power Journal of the South a[illegible]nwest

A W. R. C. Smith Publication

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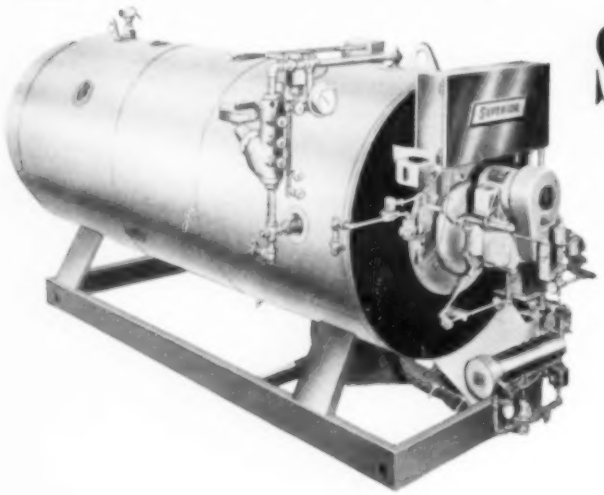
Steam Generators for Olin Mathiesu at Brandenburg, Kentucky - See P. 36

Consulting Engineers...



specify over 50% of all

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Qualified by both training and experience to specify for their clients boiler equipment which meets the requirements of the installation and *complements the consultant's selection* by its record of performance, Consulting Engineers are responsible for more than half of the Superior Packaged Boilers installed.

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There is a reason for this in basic principles of engineering design which make Superior Boilers pay dividends in long-lived satisfaction to their owners.

Skilled in evaluating boiler equipment feature by feature, Consulting Engineers appreciate Superior's conservative capacity ratings based upon a full 5 sq. ft. of heating surface per unit of Hp. They realize that Superior's 4-pass design . . . their induced draft . . . their dependable rotary burner for firing gas or oil . . . and their dimensional compactness . . . are features which result in installation and operating economies for the owner, as well as favorable recognition for the consultant.

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Superior Packaged Boilers are engineered and produced by a manufacturer who is dedicated to packaged boilers *exclusively*...a firm which is as proud of its product's reputation for performance as is the Consulting Engineer of his professional standing.

These are all good reasons why YOU should choose a Superior Packaged Boiler for YOUR installation.

Fire tube boilers for steam or hot water are supplied in sizes to 600 Bhp. Water-tube boilers up to 72,000 lbs./hr. For complete details, write for Catalog S-15.

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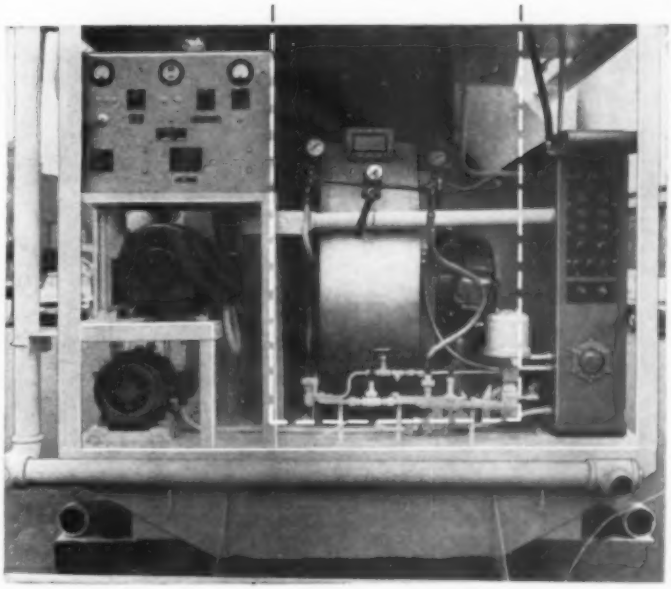
A built-in furnace, using light oil as fuel, gives a "hot foot" to the snow poured in by a conventional snowloader. The melted snow is discharged onto the street in non-freezing weather or by hose directly into sewers in freezing weather.

Speeding the melting process is a No. 117 Type XL Clarage Fan with a pancake motor. This space-saving fan arrangement suggests how Clarage "comes through" – meeting difficult design limitations – with ideal equipment for original equipment manufacturers. No matter how challenging your application requirements, investigate the plus values of incorporating dependable Clarage Fans.



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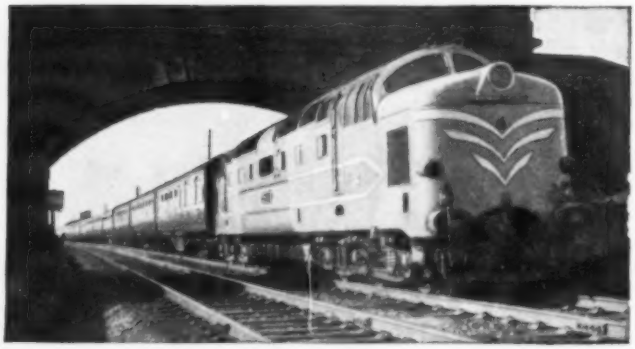
Wherever power is needed the 'ENGLISH ELECTRIC' Group is there creating new and more efficient means to generate, distribute and use it. Every 'ENGLISH ELECTRIC' job is backed by world-wide technical achievement, advanced research and manufacturing experience in five continents.

Amongst the activities of the 'ENGLISH ELECTRIC' Group are the design and manufacture of: equipment for complete electricity supply systems employing steam, oil, water, gas, or atomic power for generation; electric and diesel-electric locomotives and equipment for railway electrification; marine propulsion and auxiliary plant; aero engines, aeronautical research and testing plant, and aircraft equipment; all classes of industrial electrical equipment and complete electrifications; domestic electrical appliances; industrial electronic, radio, radar, and television apparatus, and electronic data processing equipment; meters, relays and instruments.

The Sir Adam Beck-Niagara Pumping-Generating Station in Canada incorporates six 'ENGLISH ELECTRIC' Deriaz variable pitch reversible pump/turbines. Each is rated at 45,500 h.p. as a turbine under 83 ft. head, and will discharge as a pump 4,000 to 5,000 cubic feet per second under heads from 59 to 90 ft. The pump/turbines, of a new basic design developed by 'ENGLISH ELECTRIC' in England, were supplied to the Hydro-Electric Power Commission of Ontario by English Electric Canada, a division of John Inglis Co. Ltd., and manufactured at Toronto. This illustration shows a runner hub assembly at the John Inglis plant.

On the 45-in. Universal Slabbing Mill at the Abbey Works of The Steel Company of Wales, the ingots are transferred from soaking pits to the mill by means of electrically driven rail cars. The drives and remote control scheme were engineered and supplied by 'ENGLISH ELECTRIC'. With the aid of fifteen television cameras and monitors in a closed circuit system, designed and installed by Marconi's Wireless Telegraph Co. Ltd., the operator is able to follow every stage of the operation and to control the vehicles with speed and accuracy.



The 'ENGLISH ELECTRIC' Deltic locomotive, powered by two 1,650 h.p. Napier Deltic diesel engines is the most powerful single-unit diesel-electric locomotive in the world. Twenty-two of these 3,300 h.p. locomotives are being built by Vulcan Foundry for British Railways.

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A long-established program of metallurgical and welding research is the basis for the superior quality of Kellogg-manufactured power piping systems. It has led to new raw materials, new manufacturing techniques, new performance standards—and a better product.

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These research facilities also serve as a customer service laboratory.

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HEADQUARTERS

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For more information on any of the following items—
Write the editors of SOUTHERN POWER & INDUSTRY
1760 Peachtree Road, N.W., Atlanta 9, Ga.

December, 1961

◆ UNDERSTATEMENT OF THE YEAR—The characteristics of teen-age groups have changed considerably over the past generation. They now have more privileges, more activities, and more money in their pockets. Surveys indicate that they spend from $4 to $20 per week.

With these facts in mind, the distributor to the teen-age market may assume that he is dealing with individualists. Research people can show that within each group, adolescents are the most conformist of all social groups. The fast growing teen-age market, estimated at $10 billion a year, is both baffling and rich in promise, says the latest Business Conditions Bulletin of the Alexander Hamilton Institute.

◆ NOT CAVIAR—What do visitors want from exhibitors at an industrial exposition? Lots of products or concentration on a few? Pretty girls or technical displays? Friendly salesmen or engineers?

Results of the most intensive study ever made of visitors' desires were recently published in "What They Want." Single copies are available without charge from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y. Briefly stated, they want: Technically qualified booth personnel; alert and well-trained people; less high pressure selling; fewer pretty girls; maximum number of products and their features; more product applications; better technical literature; products and developments; and exhibits that are convenient to study and understand.

◆ STEEL PRODUCTION has increased about 40 per cent since January, 1961, in Alabama and surrounding states of the South, said Max D. Howell, executive vice-president of American Iron and Steel Institute, recently in Birmingham.

"The Southern district is one of the world's great industrial areas. It consumes over 10 per cent of all finished steel shipped by the steel companies in the U.S. In Alabama and surrounding states of the South, iron and steel companies have about 75,000 stockholders and over 30,000 employees. Many thousands of other persons supply the companies here with goods and services. Over 200 million tons of steel are in use in the area, from North Carolina through Texas. This area has much to gain as steel companies strive to expand their markets."

◆ MINUS TEN TO THE SEVENTH—Whatever else may be said of the first Kennedy session of Congress, one fact stands out—it was a spending Congress. It spent more money than any peacetime Congress in history, according to a statement by Thurman Sensing in the Bulletin of Southern States Industrial Council.

The 1961 fiscal year, ending last June 30, incurred a deficit of $3.9 billion. President Kennedy, in a special message to Congress earlier, estimated the deficit for fiscal year 1962,

(Continued on Page 10)

For trouble-free underground hot pipe insulation specify GILSULATE® with Engineer-Supervised Installation

Every engineer charged with the responsibility of designing a central heating system to heat all buildings of a college, institution or industrial plant knows the money-saving advantages of such a system if properly planned. But he is aware that planning the underground piping can involve many problems, for the system must provide proper insulation and also protect pipes against corrosion, chemical and electrical attack.

The easy, one-step solution to many of the problems of underground hot pipe insulation is to call the GILSULATE distributor in your area: first, for the superior quality of the insulation material he sells and, secondly, for the excellent service he has to offer.

GILSULATE is a naturally-occurring mineral which, because of its unique chemical and physical properties, is chemically neutral in all soils, dielectric, impervious to mold, rodents and plant growth, and is water-resistant. Its thermal efficiency, low installation cost and long service life are supported by extensive laboratory and field research, and also by years of successful use in thousands of installations throughout the world.

Service that saves time and trouble—It is as important to our reputation that GILSULATE be used properly as it is for the engineer to assure his customer of an efficient, economical installation. Our distributors' experienced mechanical engineers will work with you in preparing underground piping plans, checking soil conditions and arranging for supervision of the installation work. And, without any cost to you, plans and specifications will be checked by American Gilsonite's Engineering Department.

Full-time engineer supervision of installations—Every GILSULATE installation of 30 tons or more is supervised by an American Gilsonite Company field service representative who stays on the job until it is completed. Smaller jobs are inspected by the distributor's engineer. This is a guarantee to everyone concerned...owner, architect, engineer, mechanical contractor and materials supplier...that every step of the job will be exactly to specifications.

Without obligation, we will be pleased to send you technical information on GILSULATE insulation so you can evaluate the merits of this low-cost, poured-in-place material. We will also put your name on the mailing list to receive free copies of PIPE INSULATION NEWS.

Once you have learned the merits of GILSULATE, we feel certain you will want to write your "specs" to assure the use of GILSULATE... *with engineer-supervised installation.*

FACTS ABOUT GILSULATE

1. **Easy-to-use**—just pour, shovelpoint and tamp...pipe heat does the rest.
2. **Forms protection against heat loss** and all hazards commonly encountered by buried hot pipes.
3. **Needs no housing or mechanical sheaths:** no mixing, special handling or equipment.
4. **Only needs normal pipe spacing:** for multiple pipe or cramped conditions.
5. **Four types available:**
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   Type B for 300-365° F. temp. range
   Type Special B for 365-420° F. temp. range
   Type C for 420-520° F. temp. range

The insulation for superior protection of underground hot pipes

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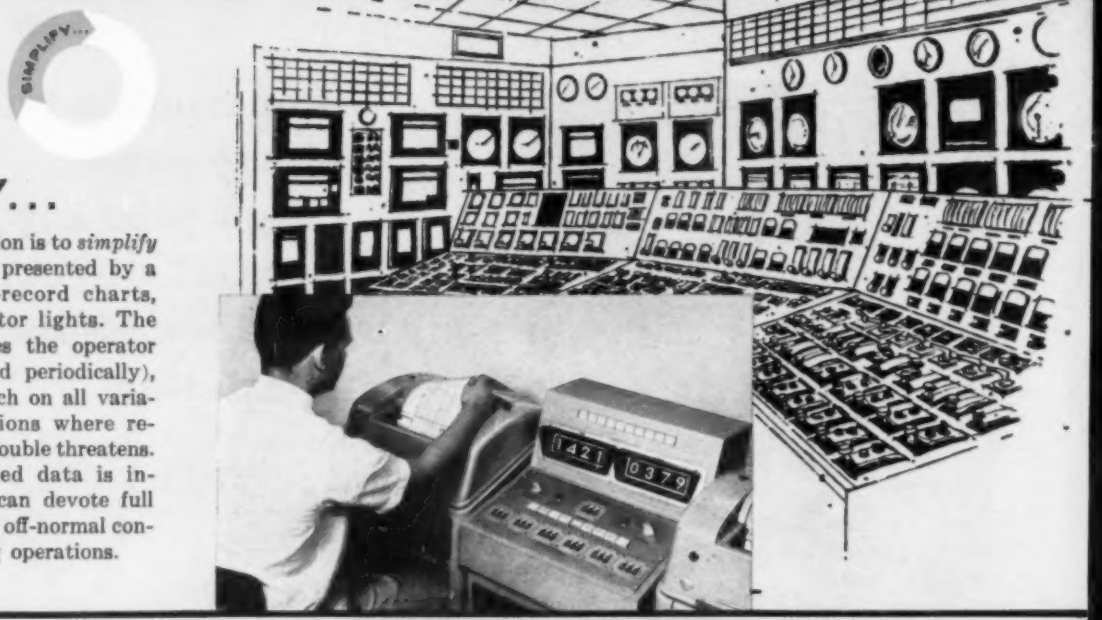
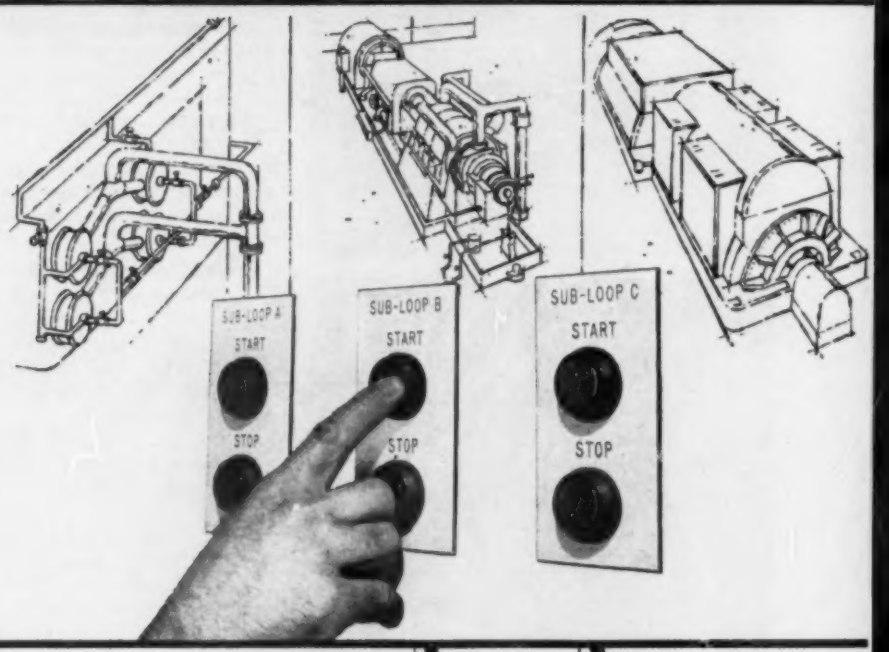
Salt Lake City, Utah

Consult the Buyers' Directory for the name of the nearest American Gilsonite Company distributor



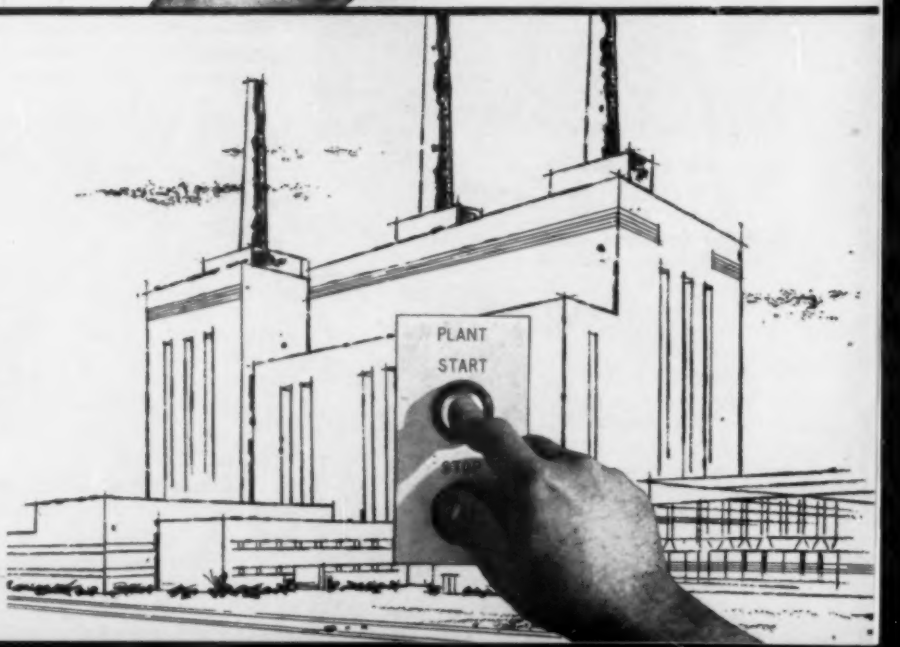
FIRST SIMPLIFY...

First step to automation is to *simplify* the information now presented by a multitude of multi-record charts, gages, and annunciator lights. The Bailey approach gives the operator data he needs (logged periodically), keeps continuous watch on all variables, makes calculations where required, alarms when trouble threatens. Reliability of recorded data is increased . . . operators can devote full attention to correcting off-normal conditions and improving operations.



NEXT VERIFY...

Next, verify the practicability of automation by extending supervisory controls, letting equipment perform more operating functions. Automate key systems, one at a time, by push-button controlled sub-loops. This approach smooths the transition to complete automation and improves safety to men and machinery by providing safe, uniform start-up, shut-down, and normal operating procedures.



THEN AUTOMATE

Final steps to automation can then be made at any time with full confidence and proved operational experience. These steps are: 1) to consolidate supervisory controls, conventional controls, and sub-loops for full-range automatic operation once the plant has been placed on the line; and 2) ultimately, to add start-stop control to provide full automation.

How to get *assured results* from AUTOMATION

...and gain as you go

Complete automation is a long step forward — with many challenges along the way.

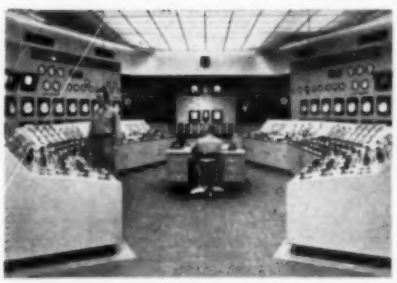
The Bailey step-by-step approach to automation makes possible step-by-step certainty ... provides step-by-step benefits ... requires only step-by-step commitment.

In the initial steps it makes possible many or most of the benefits of complete automation with considerably less investment than required for the ultimate. And it permits the decision to take each succeeding step to be made only after satisfactory evidence that it is economically justified and functionally sound.

Bailey 700 Systems draw on the best available techniques, including analog and digital manipulation, trend recording, time sharing, scanning, alarming, calculating, controlling, and logging, as required to meet operating objectives. Individual systems, including logic and sequence units, are coordinated by Bailey's distinctive method of *parallel programming* to achieve plant automation. The parallel-programming approach improves plant availability by making it practical to remove individual systems from service or reprogram without disturbing operation.

Ask your Bailey District Office, or write for more information on the Bailey step-by-step approach to automation with Bailey 700 Systems. Bailey Meter Company, 1028 Ivanhoe Road, Cleveland 10, Ohio. In Canada —Bailey Meter Company Limited, Montreal.

Bailey Systems Concepts are Founded on 45 years of Experience



Twenty-one of the twenty-six most efficient steam-electric stations in the United States use Bailey Instruments and Controls.* This reflects more than 45 years of Bailey developments devoted to improving the reliability of power-plant operation. **Listed in Federal Power Commission Report S-143.*

Bailey experience in automation dates from electrically operated boiler controls in 1924, automatic start of boiler controls on steam-electric locomotive in 1936, and fully automated package boilers in 1948. This Bailey 750 System for simplified display of power-plant operating information was installed in 1959.

Bailey experience extends to and includes the atomic power field. In the completion of the Enrico Fermi Atomic Power Plant at Monroe, Mich. in 1961, Bailey Meter Company was prime instrument contractor, supplying both pneumatic and transistorized electronic control systems. A165-2

BAILEY METER 700 SYSTEMS

BAILEY METER COMPANY

700 Systems

Facts and Trends (Continued)

at $5.3 billion. Secretary of the Treasury Dillon said recently it will probably be about $6 billion. Senator Harry F. Byrd, and many others, say it will be closer to $10 billion.

◆ BUTYL INSULATION—A survey among users of butyl rubber insulated cables has disclosed "favorable and satisfactory experience," the Fall General Meeting of the American Institute of Electrical Engineers was told.

Seventy-five questionnaires returned from industry and 111 from utilities disclosed 45 industrial and 87 utility users, with a total of 55,000,000 conductor feet in service. Forty utility users reported no failure on butyl insulated cable, and most others reported satisfactory operation although they had experienced some failures.

◆ TOO MUCH PROTECTION of large synchronous motors in industrial plants from damage caused by out-of-step operation in the utility power system should be avoided. In some cases it may be even more important to preserve the maximum degree of continuity of supply to the industrial process itself, the nation's engineers were told at the Fall General Meeting of the AIEE.

Selecting the best protection requires a careful evaluation of the severity and duration of system disturbances that can be tolerated by the motors without loss of synchronism. Otherwise undervoltage relays, for example, are likely to be set too high and time delays are likely to be set too short in an effort to protect the motor.

◆ SHOULD WE TURN OFF our fluorescent installation during lunch period or leave it on? If left on, it consumes power. If turned off, life of the tube is shortened because of the extra start which will be necessary. Westinghouse engineers have devised a simple, easy-to-calculate, cost comparison. They encourage maintenance and production heads to meet with a Westinghouse lighting specialist to make a cost reduction analysis.

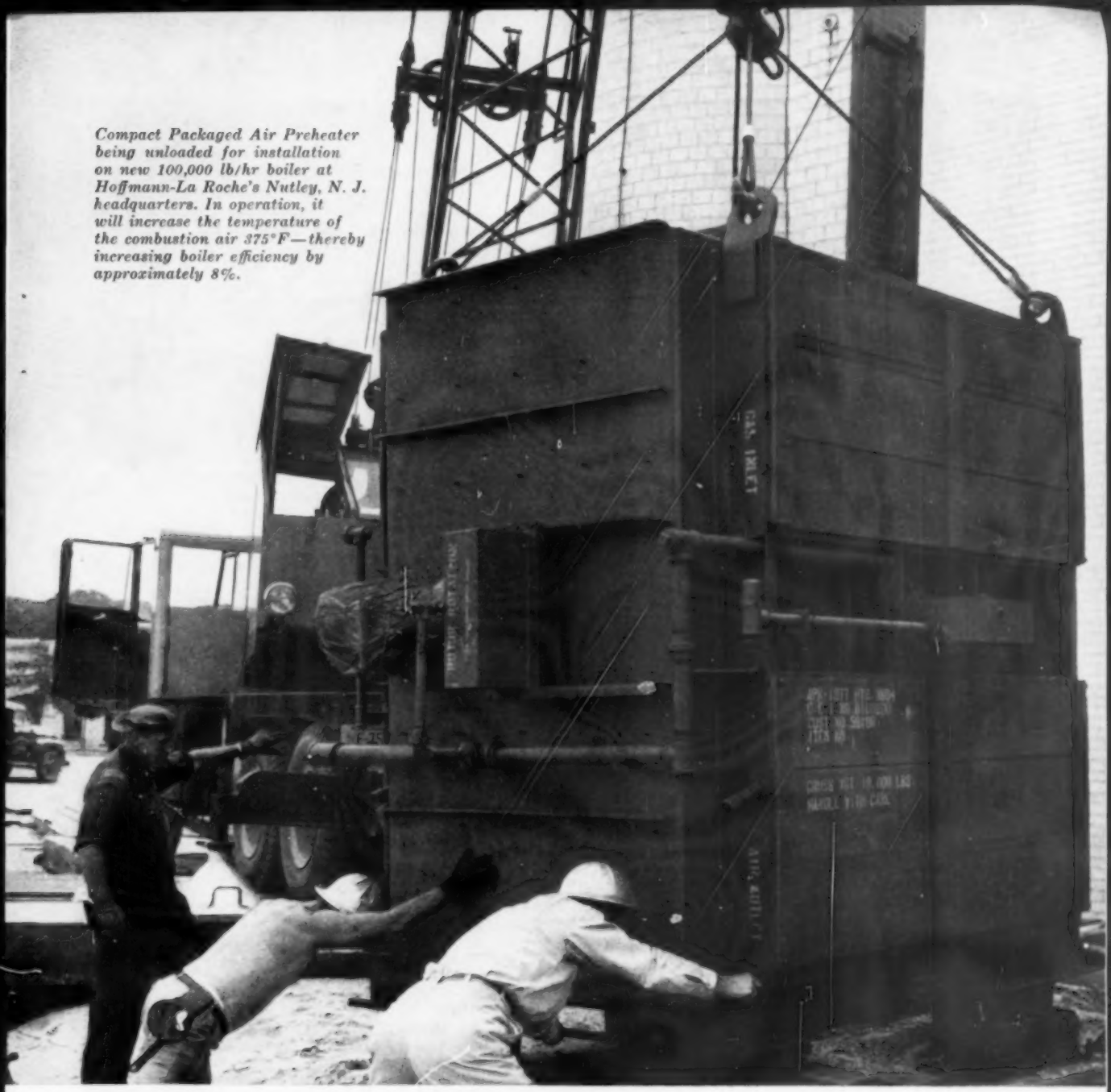
◆ SPACE AGE METALS—Westinghouse research laboratories have developed a new family of alloys. The new materials are alloys of columbium (niobium), noted for strength and corrosion resistance at very high temperatures.

High strength at high temperatures is attained without drastic loss in the workability and the low-temperature ductility inherent in the pure metal itself. Compared to most refractory metals, the new alloys are light in weight, with a density about equal to stainless steel, yet they can operate at temperatures in the range of 1800 to 3000 F. These new columbium alloys can be forged, rolled, and sheared—often at room temperature.

◆ ABRASIVE MACHINING—At least 30 per cent of the machining operations in American industry today are being done by obsolete methods, according to Richard H. Merritt, a research engineer for Norton Company.

"Abrasive machining is a way for manufacturers to save a large part of the $14 billion now spent each year just to remove unwanted metal. These 18 million tons of scrap metal cost $14 billion to remove. The cost of the material removed and the cost of removing it by cutting tools are burdens on the industry. Contrary to popular belief, metal chips have no value to the producer."

(Continued on Page 12)



Compact Packaged Air Preheater being unloaded for installation on new 100,000 lb/hr boiler at Hoffmann-La Roche's Nutley, N. J. headquarters. In operation, it will increase the temperature of the combustion air 375°F—thereby increasing boiler efficiency by approximately 8%.

PACKAGED AIR PREHEATER

WILL RECOVER 330°F FROM NEW BOILER FOR HOFFMANN-LA ROCHE INCORPORATED

Hoffmann-La Roche, one of the leading producers of pharmaceuticals, vitamins and aromatic chemicals, specified a Ljungstrom Packaged Air Preheater for their new boiler for three reasons: 1) This compact, preassembled unit is ready to run as soon as it's connected to the power line and ducts—no extra installation or erection costs; 2) The unit occupies only about 450 cubic feet of space but will cut boiler exhaust temperatures from 680°F to 330°F—for about 8% saving in fuel; 3) Savings in fuel alone—roughly 1% for every 40°F drop in exit gas temperature—can pay for the unit in two short years!

Packaged Ljungstroms are available in sizes for use on boilers in the 25,000 to 250,000 lb/hr range—can give you these same fuel saving advantages. For full information, write today for our 14-page Packaged Air Preheater booklet.

THE AIR PREHEATER CORPORATION

60 East 42nd Street, New York 17, N. Y.

Facts and Trends (Continued)

◆ CAN "FIND THE NEEDLE"— The mass of new technological information, with some 69 million pages of technical data published in 1960 alone, is so vast that some authorities have declared it more economical to re-do a moderate size research project than attempt to search available literature.

A variety of automatic storage and retrieval systems, however, now permit rapid access to the masses of accumulated data. At Western Reserve University, or example, General Electric recently installed a system which can search 50,000 abstracts within 30 minutes and type out a list of titles. A more elaborate system is now being developed which will search almost a million pages in 1 1/2 seconds.

◆ SHOP BOLTING—An increasing number of structural steel fabricators are considering high strength bolting, engineers at the American Society of Civil Engineers were told at their annual meeting, by Edward R. Estes, Jr., chief engineer, Florida Steel Corporation.

"In 1959 it was prophesied that the high strength bolt would replace the rivet in the shop. It now becomes apparent that shop bolting is also attempting to replace shop welding. Recent research studies show no reduction in beam strength when high strength bolt connectors are used. This means we will certainly see more shop bolting, regardless of whether a job previously would have been riveted or welded."

◆ ELECTRICITY—The necessity for supplementing conventional power was emphasized by D. J. Harris of the University of Sheffield (England) in a paper presented at the Fall General Meeting of AIEE. The paper was titled, The Direct Generation of Electric Power From A High Velocity Gas Jet, and was read at a symposium on magnetohydrodynamic electric generation.

After outlining methods for producing high velocity gas jets, and schemes for utilizing the electricity they generate, Mr. Harris said: "While there is still a great deal of information that is required before the feasibility of a practical generator can be confidently assessed, the advantages that could result are so great that there is every inducement for further work to be done."

◆ PLASTICS SUCCESS—Nine out of ten corrosive applications in which temperatures are below 225 F can be handled by plastic pipe and fittings now on the market, according to David W. Baird, manager of the technical department of Tube Turns Plastics Inc.

Mr. Baird said that sales of plastic pipe and fittings are 160 times what they were 12 years ago. The usual concepts of piping design and engineering must be altered to consider the increasing usefulness of plastic materials. There probably will be improvement in working temperature levels to better than 300 F within a few years.

◆ MILLION KW UNIT—Consolidated Edison Company of New York has ordered the world's largest steam turbine-generator unit from Allis-Chalmers. The million kilowatt cross-compound turbine will have five sections.

The high and intermediate pressure sections will be coupled in tandem to drive one of the two fully supercharged, hydrogen cooled generators at 3600 rpm. The three low pressure sections

(Continued on Page 14)

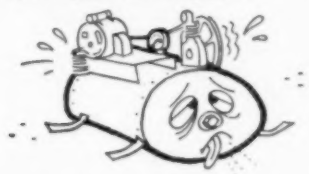
ONE OF A SERIES OF CHATS ABOUT THE CONSERVATION AND CONTROL OF HEAT

SARCO TOPICS

PREVENTION OF CRUELTY TO OLD COMPRESSORS

You've got at least one air compressor, of course. Doesn't everybody? And there it sits, pumping its heart out for you year in and year out. And you there, Simon Legree, do you ever give it a break and measure its capacity?

One measure is the useful work done by your compressed air tools, of course. However, this yard stick may make your compressor installation seem way oversize, but don't blame the equipment. The puffing oldster isn't responsible for choked intake filters, poorly designed suction pipes,



overcooling, undercooling, inadequate distribution mains and wet air. All these things can cost you.

Off and on we're going to talk about compressors in these pages, if you don't mind. It's a big subject and the lesson for today will be confined to the air intake. Can you imagine a more logical place to start?

Where to locate the intake? Easy. Where the atmosphere is clean and cool and dry. Dirty air and grit choke filters and eventually get through to cause wear. The cooler the air, the more you can compress per revolution. You'll get 10% more air delivered at 40°F. than at 90°F. And dryness is imperative, because compressed air can't contain all the moisture it can hold in its uncompressed state. Where does the moisture go? Into mains, tools, and valves, unless it's removed. And need we add that chemical fumes cause corrosion? That includes exhaust gases from engines and furnaces. CO_2 in the presence of oxygen and moisture can rust your valves, tools, nozzles and sprays.

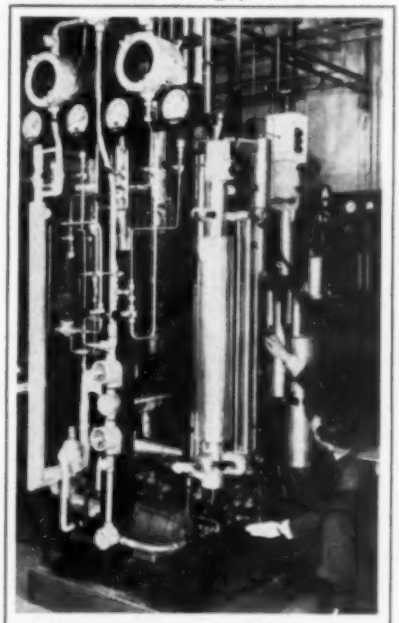
How about intake size? Keep pipes short, sized right, and straight as possible. Small pipes with snaky bends reduce pressure and capacity. For an educated example, a pressure loss due to friction in the intake pipe and filter of 2 psi (14.7 to 12.7) will reduce output of a 125 psi compressor by 7.5%.

How do we know so much? Well, as we continue in future issues, we'll be talking drains and traps and cooling and safety controls for compressors—all of which we manufacture. That's how we know so much. If you can't bear to wait, just write. It's that easy to get information out of us.

SARCO AND THE FLYING DUTCHMAN

In the pipe shop of a major office building complex on New York's east side, the Flying Dutchman flies again. This is really a bright idea which could well become standard practice elsewhere, because it's the kind of logical precaution that would make sense anywhere.

The chap in our photograph is putting together, according to precise, dimensioned drawings, an assembly consisting of a Sarco Thermo-Dynamic Steam Trap, Type TD-50, a Sarco strainer, and valves and fittings for stock. The assemblies will be used for quick and easy replacement in the event of failure or any possible maintenance requirement in the steam distribution system, the heating system, or the air conditioning system.



WORLD'S LARGEST ESPRESSO MACHINE?
No indeedy. It's a pilot plant Hydrofiner unit built by The Lummus Company at its Engineering Development Center in Newark, New Jersey. And its presence here is due to the fifteen ⅜" Sarco Thermo-Dynamic Steam Traps which vent and drain its 35 pound tracer lines plus a ½" TD-50 as a main drip. Nice to be picked for projects like this. Makes us proud.

We'd like to be able to report that this plan recently saved thousands of people from freezing or roasting during a crisis. So far, however, the assemblies have proved to be an ornamental kind of insurance policy. Alas, there have been no failures. That dog-goned Sarco performance is just too reliable for its own good.

SOUTHERN COMFORT

It's true what we've said all along about Dixie: Sarco is well represented in the South. In fact, there are Sarco representatives in 29 southern cities. This means that your pesky problems of conserving and regulating heat have available solutions nearby. No room for addresses and phones here, but here are the southern Sarco cities and the organizations to call. *Alabama*, Birmingham, Bratton Sales Engineers; *Arkansas*, Little Rock, J. L. Brown Sales Co.; *D. C.*, Washington, Sarco Company Inc.; *Florida*, Pensacola, Sansing Sales Enginers; Tampa, O. H. Howell Mfrs. Agent, Inc.; *Georgia*, Atlanta, John F. Templeton Co.; *Louisiana*, Shreveport, J. W. Cherry Company; New Orleans, Frank A. Birdsong; *Maryland*, Baltimore, J. E. Perkins Corp.; *Mississippi*, Jackson, Robert Porter; *Missouri*, Kansas City, Smith Steam Spec. Co., Inc.; St. Louis, Sarco Co., Inc.; *North Carolina*, Charlotte, Hoffman & Hoffman Co.; Raleigh, Hoffman & Hoffman Co.; *Oklahoma*, Tulsa, Vanco Engineering Co.; *South Carolina*, Columbia, Hoffman & Hoffman Co.; Greenville, Hoffman & Hoffman Co.; *Tennessee*, Knoxville, Walter F. Sutton; *Texas*, Dallas, Gilbert Engineering Co., Inc.; El Paso, Engineered Equipment Inc.; Ft. Worth, Gilbert Engineering Co,. Inc.; Houston, Esch and Associates, Inc.; San Antonio, L. S. Pawkett & Co.; *Virginia*, Richmond, Robert S. Lovelace Co., Inc.; *West Virginia*, Charleston, Angus Gillis & Son.

There's really no reason to keep this conversation one-sided. After all, we're both interested in these subjects or you wouldn't have read this far. So write, even if it's only about a difficult problem.

8597

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STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS • HEATING SPECIALTIES

SARCO

will be coupled in tandem to drive the other generator at 1800 rpm. Steam will be supplied to the high pressure turbine at 2400 psi and 1000 F. Discharge from the high pressure section will return to the boiler for reheat to 1000 F before entering the intermediate section and continuing through the three low pressure sections.

◆ AUTOMATIC CONTROL—The oldest school of its kind in the United States—Minneapolis-Honeywell's Philadelphia based Instrumentation Education Center will offer two additional courses in 1962: "Control Dynamics" and "Fundamentals of Instrumentation."

Since 1935, when the school was founded, it has been attended by more than 6,000 students from 33 countries and representing every major industry and many government agencies. Control systems that are growing in size and complexity in both the military and industrial areas, and the urgent need for highly trained instrument technicians and specialists, prompted enlargement of the curriculum.

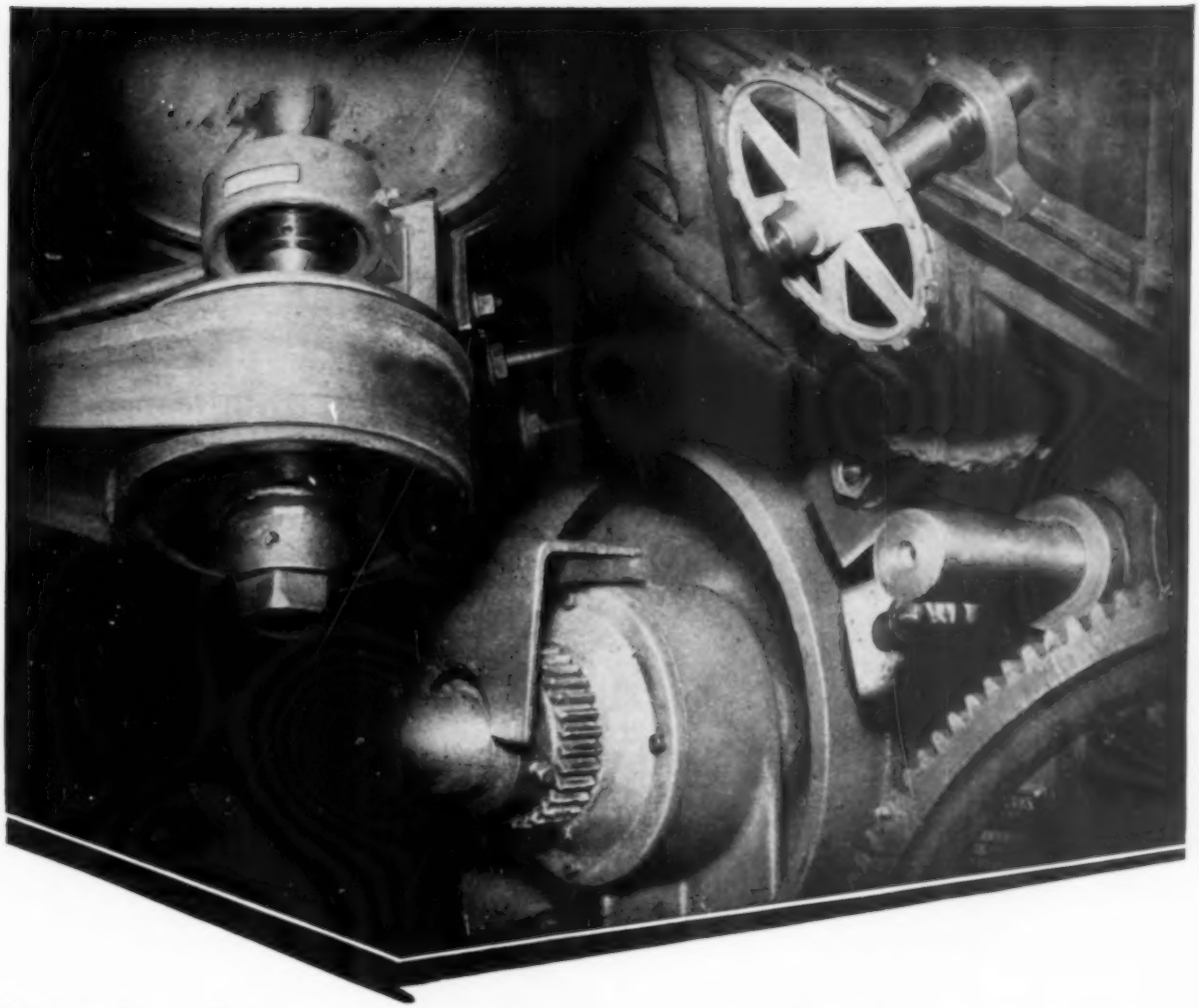
◆ SPOT COOLED FLUORESCENT—A breakthrough in getting greater light output from outdoor fluorescent lamps without using larger lighting units is in sight, the Illuminating Engineering Society was told by Harold A. Van Dusen, Jr., and Edward F. Schraith of Line Material Industries.

A new fluorescent lamp having essentially constant light output over a wide temperature range uses the principle of controlled spot cooling to maintain the light output at temperatures that would otherwise be too high. A thermoelectric heat pump is used to spot cool the lamps.

. . . . . REPRINTS AVAILABLE . . . . . .

Write the editors of SPI for small quantities of the following at no charge.

- ELECTRICAL DISTRIBUTION FOR LARGE PLANT—An 8-page special report prepared jointly by Director of Facilities, the Consultants, and the Contractor—describing plans and installation of all electrical services for new plant of Texas Instruments Inc., Dallas, Texas.
- HOW EPOXY CAN SERVE YOU—4 pages. Tells exactly how 10 separate repair jobs were handled and describes several epoxy mixes that are good for maintenance jobs.
- MATERIAL HANDLING EQUIPMENT—An 8-page special booklet prepared by the editors of SPI from equipment manufacturers' releases. Lists 69 catalogs and describes 22 items of new equipment.
- THERMAL INSULATION DIRECTORY:
  Tells where to get service and technical data..... 6 pages
- WATER TREATMENT DIRECTORY:
  Tells where to get service and technical data.....12 pages
- AIR & GAS CLEANING DIRECTORY:
  Tells where to get service and technical data.....16 pages
- COMBINED GAS-STEAM CYCLE PERFORMANCE:
  First year report on new plant, West Texas Utilities Co.... 6 pages
- PAINTS & PROTECTIVE COATING DIRECTORY:
  Tells where to get service and technical data.....12 pages
- ORIFICE METER INSTALLATIONS—8 pages. Tells what the plant man needs to know about installation to get accurate, dependable service.



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Many of our customers have realized considerable savings by converting to anti-friction bearings. Our bearing engineers recommend the best bearings for each type of application, design and supervise production of the special housings often required.

The result is a clean, economical conversion that is quickly installed and materially reduces maintenance and lubricating costs. Production, with better quality, is usually increased.

Ask a Dixie Bearings engineer to survey your production machinery. He may be able to suggest and recommend bearings that will increase production at lower cost. Changeovers from plain bearings to anti-friction bearings are a specialty with us.

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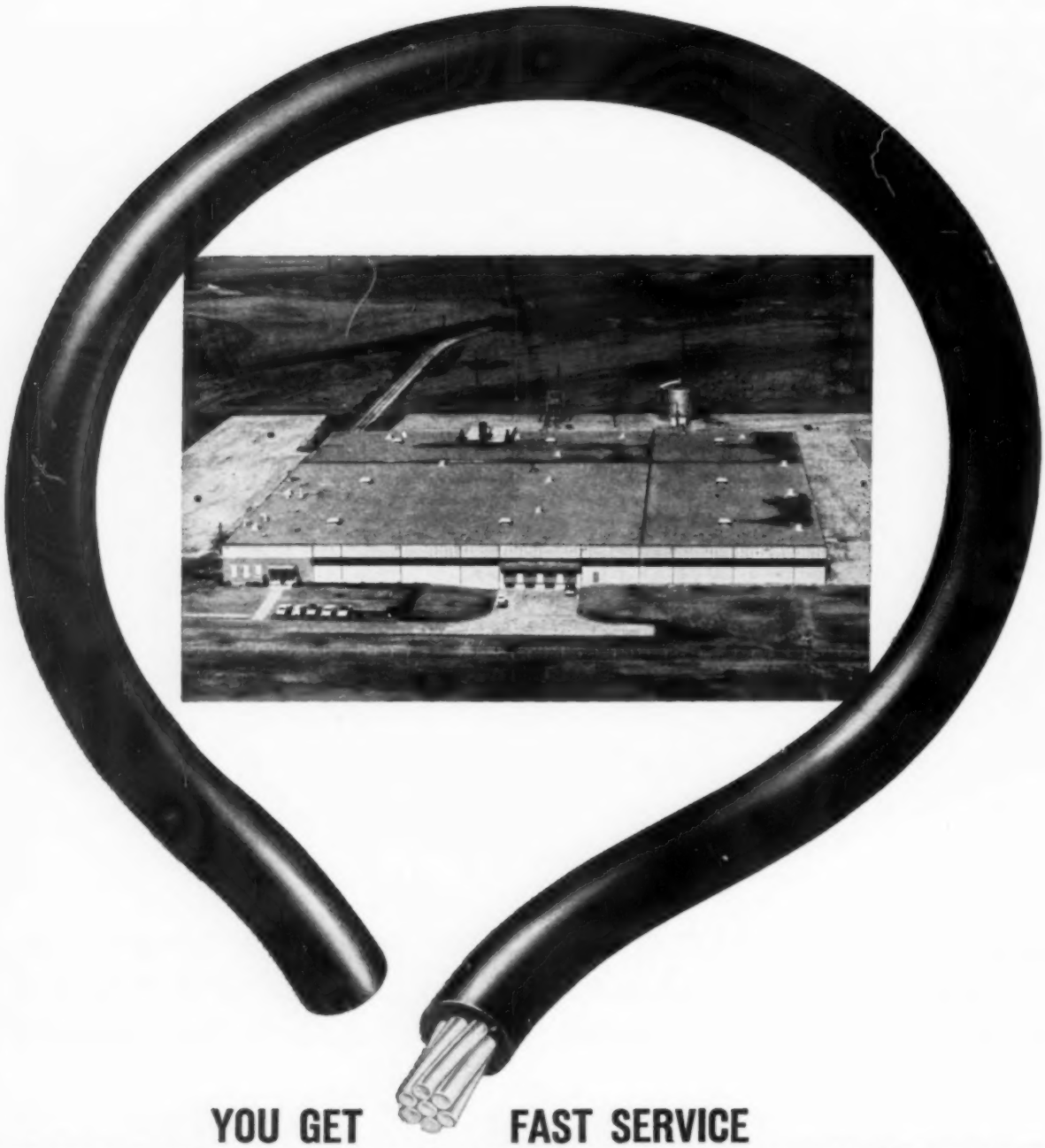

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Georgia Power Breaks Ground for New Plant

Groundbreaking ceremonies marking the beginning of construction for Plant Harllee Branch, **Georgia Power Company's** $42 million steam-electric generating plant, were held on Oct. 16.

A featured speaker for the occasion was Mr. Harllee Branch, Jr., for whom the plant is being named. Mr. Branch is president of The Southern Company, and is a director and vice-president and past president of Georgia Power Company.

Generating capacity of the initial unit, scheduled to be in production in 1965, will be 250,000 kilowatts. The water site, on the company's 15,000-acre Lake Sinclair, has the potential for development of a plant with a capacity of 1.5 to 2 million kilowatts.

The photograph shows C. B. McManus, a former president of Georgia Power, and a retired chairman of the board of The Southern Company; Harllee Branch, Jr., for whom the new plant is named; John J. McDonough, president of Georgia Power Company; and W. P. Hammond, a retired vice-president.

Lockheed-Georgia Safety Record

Working a full year without a single lost-time injury has set a new all-time safety record for employees of the **Lockheed-Georgia Company's** swing shift.

A total of approximately 2,000 employees have worked nearly three million man-hours without an accident causing anyone to lose time from the job.

The aircrafters are making C-130 airlifters and C-140 turbojet transports and are beginning work on the C-141 turbofan air cargo plane.

Carling Brewing Co. Fort Worth Plant

The Fort Worth firm of Preston M. Geren has been retained as architect for the new multi-million dollar **Carling Brewing Company** plant to be built in Fort Worth.

The plant will be designed so that it can be expanded to a maximum capacity of 1,000,000 barrels. Initially, it will be the same size as the Carling plant in Atlanta.

It will take approximately one year to complete the drawings for the plant, and actual construction will take about 14 months.

Clear Span Structure Erected in Oklahoma

What is believed to be the largest clear span structure of its type in the world is being erected at Alva, Oklahoma, by **American Steel Building Company, Inc.** of Houston, Texas.

Although the design can be converted to many industrial uses, the mammoth building was designed especially to meet the needs of Bartlett Grain's Bewley Mills, Inc. It is 260 ft long, 256 ft wide, and 91 ft tall at the highest point. It is pre-engineered and prefabricated.

The interior of the all-steel structure is entirely free of columns or supporting cross-ties. Storage capacity is estimated at 3,000,000 bushels.

Saco-Lowell Shops Vice-Pres. — S. C.

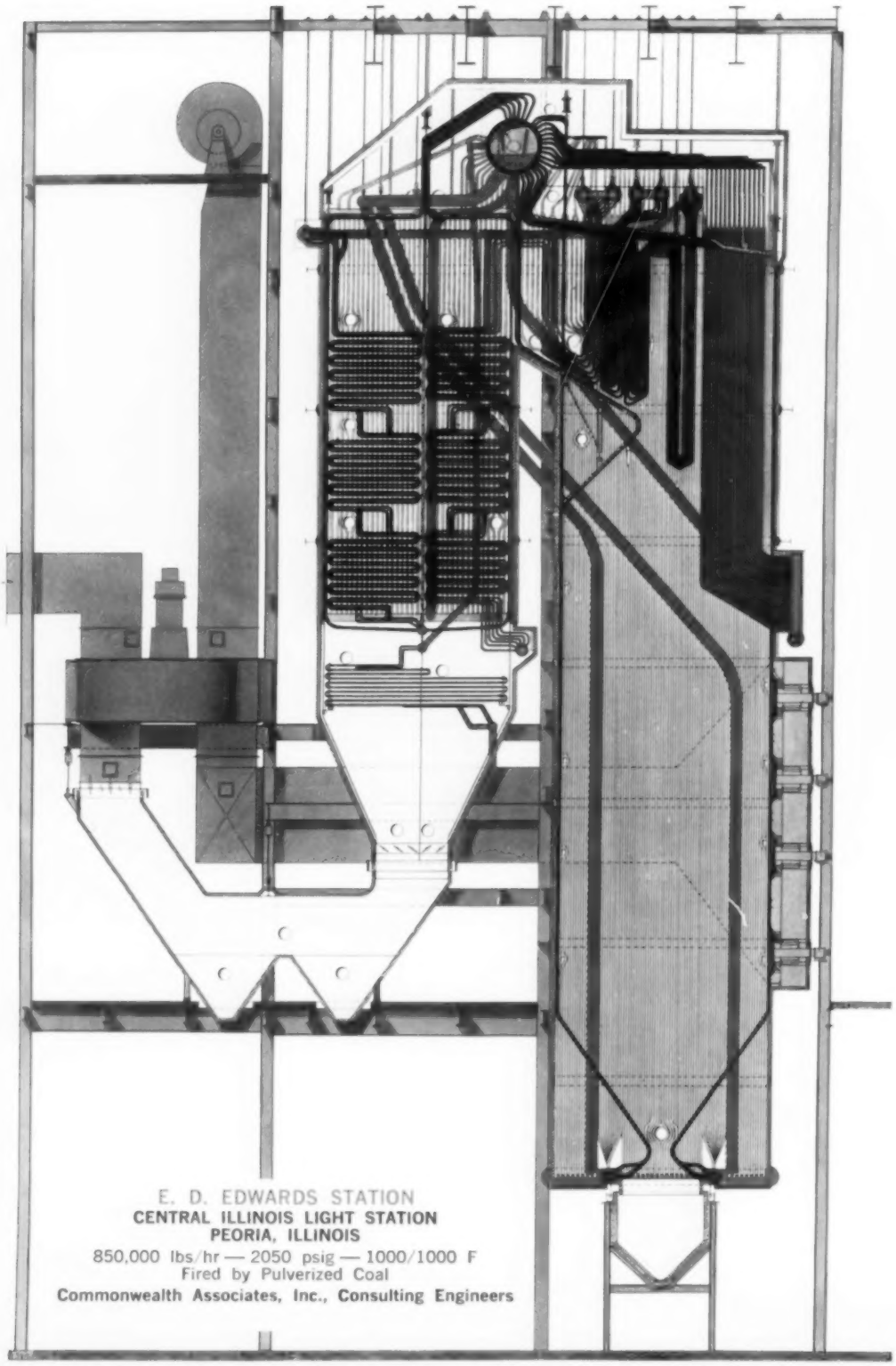
Richard D. Abelson has been named vice-president for manufacturing of the Textile Machinery Division of **Saco-Lowell Shops,** a subsidiary of Maremont Corporation, Chicago.

The company maintains textile machinery manufacturing plants and facilities in Sanford and Jonesboro, North Carolina, and in Easley and Greenville, South Carolina.

Mr. Abelson, who will be headquartered in Easley, has been associated with Maremont Corporation and its various subsidiaries since 1946 when he joined Maremont as an industrial engineer.

Central Illinois Light Company has

850,000 lb/hr Boiler at



E. D. EDWARDS STATION
CENTRAL ILLINOIS LIGHT STATION
PEORIA, ILLINOIS
850,000 lbs/hr — 2050 psig — 1000/1000 F
Fired by Pulverized Coal
Commonwealth Associates, Inc., Consulting Engineers

A careful survey of your plant by a qualified consulting engineer could show ways of making substantial savings in power costs.

another good **RILEY** *performer*

E. D. EDWARDS STATION

Central Illinois Light Company has purchased Riley Steam Generating Equipment since 1938. The latest, this 850,000 lb/hr reheat boiler, brings CILCO's total steam capacity with Riley boilers to 3,415,000 lb/hr. Six Riley boilers in operation at CILCO's R. S. Wallace Station at East Peoria, Illinois are continuing to provide dependable operation with records of high availability.

The new Riley boiler at the E. D. Edwards Station, which started operation in April, 1960, is living up to the reputation established by its predecessors.

Reheat steam temperature is controlled by gas flow dampers located below economizer; superheat is controlled by spray. Water tube platens in furnace add to furnace cooling and produce uniform furnace exit temperatures.

Central Illinois Light Company is one of many investor owned electric utilities that have repeatedly purchased Riley equipment. Today, many electric utility customers are installing Riley equipment because they recognize Riley's progressive design of boilers tailored to the requirements of the Electric Power Industry.

Investigate Riley's newest boiler designs. Call your local Riley representative or write RILEY STOKER CORPORATION, WORCESTER, MASSACHUSETTS.

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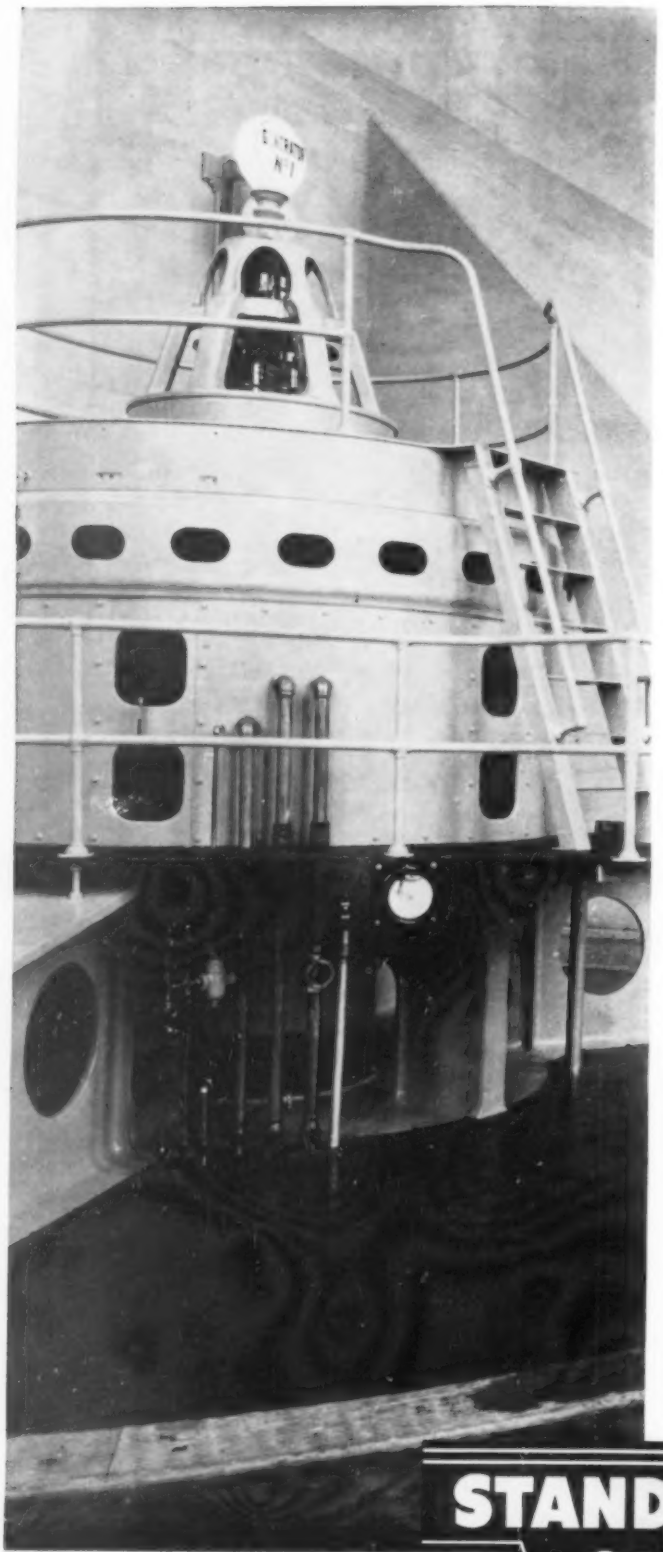
RILEY

STEAM GENERATING & FUEL BURNING EQUIPMENT



right at scene of action

Continuous action in power equipment means friction, heat and wear —if the *right* lubricants aren't at the *right* places.

For 74 years STANDARD OIL has been *right* at the scene of action with *tailored-to-the-job* lubricants. These valuable years of experience in helping to solve a wide variety of industry's lubricating problems, plus the unexcelled resources for research behind STANDARD OIL Lubricants, are all available to you whenever you have an unusual problem in lubrication.

Whatever your lubrication requirements, your STANDARD OIL representative is able and ready to assist you in getting the *right* lubricant on the job. Call him today.

STANDARD OIL LUBRICANTS

STANDARD OIL COMPANY
(KENTUCKY)

CP&L Ground Breaking

President Louis V. Sutton of **Carolina Power & Light Company** operated a bulldozer to officially break ground for a new 250,000 hp generating plant at Skyland, in Western North Carolina, on October 18.

U. S. Senator Sam J. Ervin, Jr., principal speaker for the ceremonies, cited the fact that the United States now produces more power than the next five largest countries combined — and three times as much as Russia.

When the multi-million dollar plant goes into operation, it will bring CP&L's total system generating capability to well over 2,500,000 hp. The plant site is located on a high knoll just west of Skyland. To the south is the Pisgah Mountain range; higher peaks of the Blue Ridge lie to the west and north. A 300-acre lake will form on Powell Creek near the plant to supply cooling water for its condensers. The 16-story boiler will produce about 1,400,000 pounds of steam per hour to turn the plant's turbine-generator. Electricity generated at 18,000 volts will be stepped up to 110,000 volts for transmission to points of delivery.

FUTURE EVENTS of Engineering Interest

Jan. 22-25, 1962: Plant Engineering & Maintenance Show & Conference, Convention Hall, Philadelphia. Clapp & Poliak, Inc., 341 Madison Ave., New York 17.

Jan. 29-Feb. 2, 1962: AIEE Winter General Meeting & Electrical Engineering Exposition, New York Coliseum. Reber - Friel Co., Mgr., 117 S. 17th St., Philadelphia 3, Pa.

March 4-6: Southern Safety Conference & Exposition, Marion Hotel, Little Rock, Ark. W. L. Groth, Exec. Dir., P. O. Box 8927, Richmond 25, Va.

April 9-13, 1962: 43rd Annual Convention & Welding Exposition, Sheraton Cleveland Hotel & Cleveland Public Auditorium, Cleveland, Ohio. Information Center, American Welding Society, 345 E. 47th St., New York 17.

1962 Meetings & Conferences, American Society of Mechanical Engineers, 345 East 47th St., New York 17, N. Y.

March 4-8: **ASME Gas Turbine-Process Industries Conference & Products Show,** Shamrock Hilton Hotel, Houston, Texas.

March 27 - 29: **American Power Conference,** Sherman Hotel, Chicago, Ill.

April 5-6: **ASME - SAM Management Engineering Conference,** Statler Hilton Hotel, New York.

April 9-13: **ASME Metals Engineering Conference,** Sheraton Cleveland Hotel, Cleveland, Ohio.

April 11-13: **ASME Spring Textile Engineering Conference,** North Carolina State College, Raleigh.

April 15-19: **ASME Oil & Gas Power Conference & Exhibit,** Shoreham Hotel, Washington, D. C.

May 7-8: **ASME Maintenance & Plant Engineering Conference,** Royal Orleans Hotel, New Orleans, La.

June 4-6: **ASME Lubrication Symposium,** Deauville Hotel, Miami Beach, Fla.

Sept. 13 - 14: **Joint Engineering Management Conference,** Roosevelt Hotel, New Orleans, La.

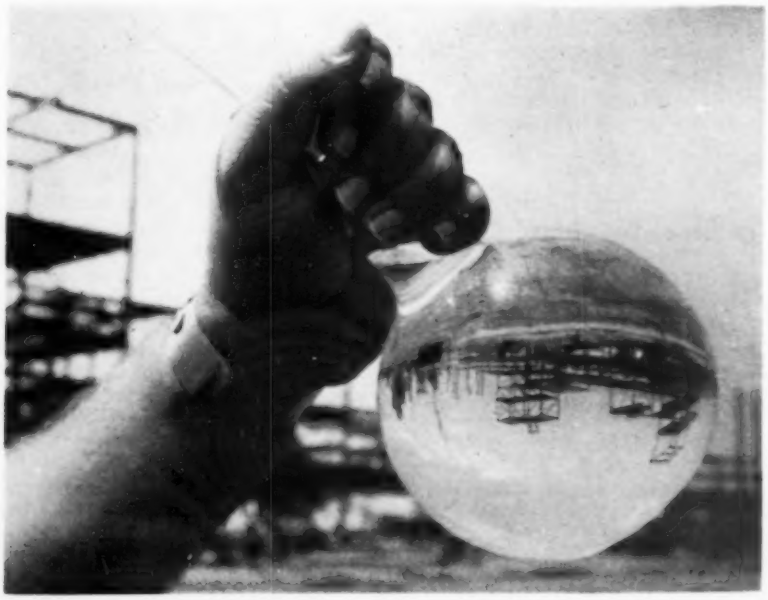
Sept. 23-26: **ASME Petroleum Mechanical Engineering Conference,** Sheraton Dallas Hotel, Dallas, Texas.

Sept. 24-26: **ASME-AIEE National Power Conference,** Lord Baltimore Hotel, Baltimore, Md.

Nov. 25-30: **ASME Winter Annual Meeting,** Statler Hilton Hotel, New York.

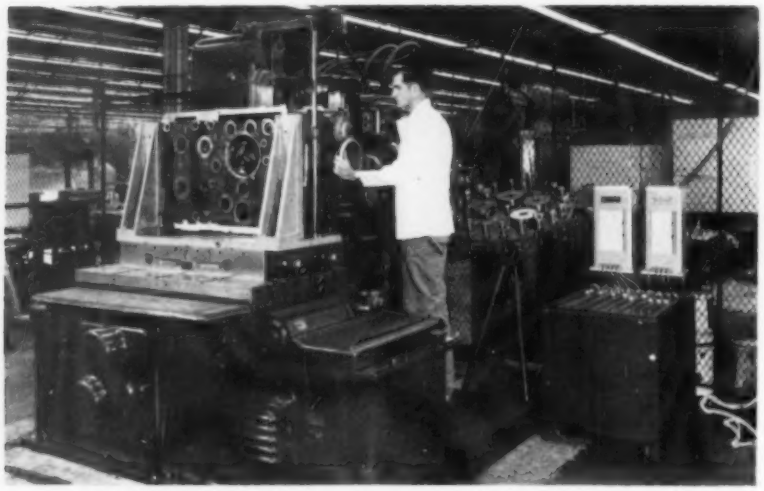
Kentucky Glycerin Plant

This picture, shot through a Florence flask containing glycerin from a pilot plant, gives a crystal ball effect of the steel framework for the new glycerin plant in the background. The plant is being built by **Olin Mathieson Chemical Corporation** at the Organic Division's Doe Run plant in Brandenburg, Ky. Operations are scheduled to begin in April, 1962. Production capacity will be more than 40 millions pounds a year.



IES El Paso Chapter

Illuminating Engineering Society recently approved the grant of a charter to the El Paso Chapter, with headquarters in El Paso, Texas. Territory includes several counties in Texas and New Mexico.



This DeVlieg 3B-48 Jig-Mill equipped with "Duplitrol" bars, insures the precision necessary in the "heart" of the Rovematic. Twenty-seven separate moves by this machine, controlled by the Duplitrol bars, insure centerline accuracy to within .0002".

New Machine Tools Saco-Lowell, Easley, S. C.

Saco-Lowell Shops has announced that full production of the revolutionary new Rovematic high speed Roving Frame is in process at the Easley, S. C., plant. Russell Mfg. Co., Inc., of Alexander City, Ala., received the first Rovematic to come off the production line.

Russell's 96-spindle frame will operate at speeds up to 1200 rpm. A frame of this size operating at this speed will consume up to 96 bales of cotton per week, building 14 x 7 inch packages that will weigh six or more pounds each.

In June of 1961, Saco-Lowell started installing new machine tools specifically for the building of the new roving frame. Tooling for this single machine is probably the most costly program ever undertaken by a textile machinery builder, approaching close to $1 million.

Potomac Electric — Chalk Point Station

An order for two giant Universal Pressure boiler systems, capable of generating a combined total of 5 million pounds of steam per hour, has been awarded to **The Babcock & Wilcox Company** by **Potomac Electric Power Company**, of Washington, D. C.

The two boilers are scheduled to go into operation in 1964 and 1965 at a $105 million electric generating station to be built in Prince George's County, Maryland. The 670,000 kilowatt power plant will be called Chalk Point Station.

The new boilers will increase Potomac's over-all generating capability from 1,453,000 kilowatts to 2,123,000 kilowatts, and will increase its generating stations in the Washington-Maryland area to five. The company serves an area of 643 square miles and an estimated population of 1½ million.

The General Electric Company has been awarded a contract for two 335,000-kilowatt turbine-generators by **Potomac Electric Power Company.** Both powermakers will be installed in the new steam-electric generating plant at Chalk Point.

Turbines for Grand River

The Grand River Dam Authority has awarded to **The English Electric Corporation,** New York City, a contract worth approximately $2.5 million for the design, manufacture and delivery of four 35,000 hp, 90 rpm, Kaplan water turbines for a new dam at Markham Ferry, Oklahoma.

Consulting engineers for the project as a whole are **W. R. Holway & Associates** of Tulsa, Oklahoma, who were also responsible for an earlier dam constructed by the Grand River Dam Authority at Pensacola.

PLANT PERSONNEL

Appointed to the newly created position of plant manager for Eastern Stainless Steel Corporation at Baltimore, Maryland, is **E. L. LaGrelius.** Mr. LaGrelius has had more than 30 years experience in the steel production field.

William E. Green is manager of the new Owens - Illinois plastic bottle plant at the corner of Hamilton and Browns Mill Roads, Atlanta, Georgia. He has been with the company since 1936. . . . The recently constructed Owens-Illinois Glass Company plant on Hovis Avenue in Charlotte, North Carolina's Chemway Industrial Park is managed by **John D. Flexon.**

E. I. Henning has been appointed general manager of the Sulphur Springs, Texas, plant of Rockwell Manufacturing Company. He succeeds **E. E. Matheson,** who now has over-all charge of Sulphur Springs Division operations as assistant to the vice-president.

M. S. Jorgensen is plant manager at Bestwall Gypsum Company's new Wilmington, Delaware, plant.

Raymond K. Serfass is general manager of the Westinghouse air conditioning division at Staunton, Virginia, where a $2 million plant expansion program is in progress.

Arkansas Power Plant

The U. S. Army Corps of Engineers has ordered four waterwheel generators from **Westinghouse Electric Corporation** for use in the new Dardanelle Lock and Dam Powerhouse near Dardanelle, Ark. The contract is valued at several million dollars.

Each of the generators will be rated at 32,632 kilovolt-amperes. The dam, to be located about one mile upstream from the town of Dardanelle, on the Arkansas River, will have a lock for river traffic in addition to the power generating equipment.

The first unit is scheduled for installation in August, 1964. All four generators are expected to be in commercial operation by September of 1965.

4 WAYS MONEY LEAKS THROUGH YOUR ROOF...

Left to right: **TRAPPED WATER VAPOR** creates these delamination blisters, which eventually break, causing leaks. **RANDOM CRACKS** mean top coating is being pulled apart by internal shrinkage stresses, exposing underlying felts and leading to complete roof failure. **COLONIES OF PIN BLISTERS** are another result of trapped water vapor. **DIRECTIONAL CRACKS** come from shifts and settling of deck or building, exposing felt and destroying protection.

...AND HOW LION ROOF PERM STOPS IT

New Lion Nokorode Roof Perm eliminates the two major causes of roof failure — trapped moisture vapor and stress effects.

Roof Perm is the first cold-applied roof coating ever developed which efficiently "breathes" out trapped moisture vapor.

Roof Perm remains pliable for the life of your roof, expanding and contracting with the roof deck and building to avoid cracking.

For permanent roof protection, and far lower roof maintenance costs, repair, recoat, recover or reroof with Roof Perm.

LION

Protective Coatings, Section 14

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Send for your free copy of Lion's new and authoritative 36-page manual, "Controlled Roofing Design and Maintenance," which includes typical specifications for complete roof construction.

INDUSTRY SPEAKS

Fuel Cells May Be Source of Electric Power in Five Years

Utility Company Official Foresees Both a Promise and a Threat

IF CURRENT INTEREST is maintained "it is likely that fuel cells will serve as power sources in special application within the next five years." Fuel cells to furnish electricity at home are "entirely conceivable."

More than 60 governmental and industrial fuel cell projects, costing $28,000,000 annually are now under way, James D. Flynn, of the Cincinnati Gas & Electric Company, reported at a symposium on fuel cell developments and applications during the Fall General Meeting of the American Institute of Electrical Engineers.

"The goal in mind is that someday this might be a cheap and compact successor to power plants, ranging in size from the internal combustion engine all the way up to a power plant generating station," Mr. Flynn observed.

Initially, fuel cells probably will be restricted to uses where excellence of fuel efficiency, silence, freedom from fumes, and simplicity of design and operation are important requirements. But as technology advances "they may be used first in conjunction with off-peak gas generator facilities that produce hydrogen and oxygen which can be stored, transported and utilized at will in fuel cells. They may then be used to supply low voltage constant loads for such electrochemical processes as plating, water purification, galvanizing, electrolytic cleaning and electrolytic refining of metals."

Fuel cells also may be used to supply electricity in places too remote for power lines or gas mains, and utilizing energy in the form of bottled gas or tanks of oil. As fuel cells are small, but efficient, they may be used in small stationary power plants, such as emergency units in hospitals, small factories, motels and farms.

"It is entirely conceivable that there will be a period in our future when central power stations will give way to individual fuel cells in every home. At a later period when fossil fuels have become so scarce that they can no longer be used for fuels we may revert again to a central distribution, possibly using a combination nuclear reactor fuel cell generating plant."

Mr. Flynn pointed out that "fuel cells present both a promise and a threat to the electric utilities. Their remarkable efficiencies promise to lower production costs of electricity. But since they are efficient in small sizes as well as large they potentially can put each home owner in the power plant business."

The greatest role of kva sized fuel cells will, however, be that of powering mobile equipment rather than producing "homemade" electricity. Initially competition will be brisk among oil, gas and electric utilities, but when fuel cells reach megawatt size, they will tend to favor electric utilities over other energy suppliers.

Mr. Flynn listed the following advantages of fuel cells: silent operation, lack of moving parts, convenience in scaling power systems up or down, fewer maintenance and reliability problems, ease of tapping for supplying a variety of loads, relatively high energy per unit weight, a high specific power output particularly in the range of small sized devices.

Disadvantages are: the tendency for efficiency to be highest at light load and to drop off with increasing load; the voltage drop attendant with increased current output; present non-existence of materials for electrodes and electrolytes that are at once resistant to high temperature corrosion and are highly conductive and low in cost; and production of direct current in an economy that now uses alternating current almost exclusively.

"Foreseeable" improvements in the steam plant may cut 1/3 mill from fuel cost but "the fuel cell may reduce these costs by as much as 1¾ mills. As a base load generator this could mean savings of hundreds of millions of dollars a year," Mr. Flynn said.

HERE'S HOW KEELER dk solved dual problem for Texas manufacturer

1

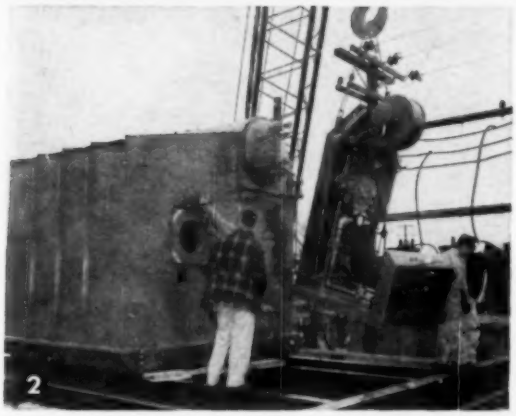
ROOFTOP BOILER INSTALLATION SOLVES MID-CITY SPACE-CAPACITY PROBLEMS FOR HOUSTON INDUSTRY

F. H. MALONEY CO. was faced with insufficient steam standby from earlier expansion. With further plant enlargement planned, greater steam capacity was a must and space was not available to simply add another steam generator. Their processing needs in making metal, plastic and rubber products for the petroleum industry called for a fully dependable, flexible source of low cost, quick response steam generation without the excessive installation costs experienced with previous equipment.

Howell Engineering Corporation, Keeler representative in Houston, recommended the rooftop placement of a Keeler DK water tube package steam generator with controls duplicated in the plant. The Keeler DK design offered higher steaming capacities and efficiencies than similar units of the same total heating surface—*at lower cost.* Rapid circulation and better gas flow were further advantages.

Installation (independent of the roof proper in unused space) was comparatively easy, fast and low in cost, handled by Maloney maintenance men under Howell Engineering supervision. The customer's reaction? *"A fine job that saved us $4,500. The boiler's working perfectly, easily carries the plant load with constant pressure at the boiler nozzle despite sharply fluctuating steam demands"!*

The steam generator is a gas-fired Keeler DK 8-4A (8000-lb stm/hr capacity). It's one of 24 sizes in multi-purpose Keeler DK's for gas, oil or combination firing in capacities up to 100,000-lb stm/hr. *Write or phone for complete information—there's a Keeler unit to efficiently, economically serve your needs.*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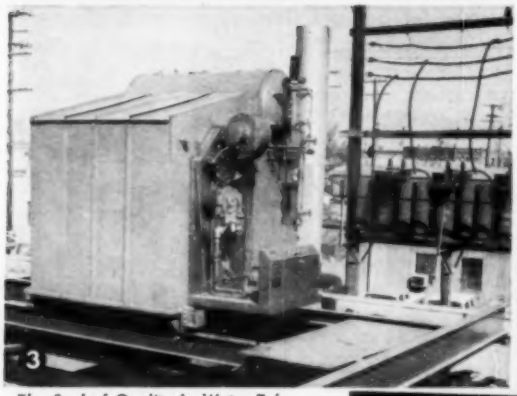
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HERE'S HOW THEY DID IT—1—Package boiler lifted by crane from flatbed trailer. 2—Burner and controls unit positioned by same erection crew. 3—Complete "package" mounted on steel framework base, independent of roof proper. 4—Unobtrusive appearance from street shows completed installation with enclosure extending from boiler front over burner and combustion controls.

4

The Seal of Quality in Water Tube Steam Generators

KEELER WATER TUBE Boilers

— ESTABLISHED 1864 —

E. KEELER COMPANY
West & Church Sts. • Williamsport, Penna.
— OFFICES IN PRINCIPAL CITIES —
In Canada: Canadian Vickers, Ltd., Montreal, P. Q.

WRITE FOR FREE BULLETINS
No. DK-2: Type DK Package Boilers
No. F-14: Type CP Boilers
No. M-2A: Type CPM Package Boilers
No. MK-1: Type MK Boilers
No. MKL-1: Type MKL Boilers

TIMELY COMMENTS

Plan to Keep Abreast of Fast-Moving Developments

Technological Changes Impose New Demands on Engineering Managers

RAPID PRODUCT OBSOLESCENCE and the need to keep abreast of fast-moving technological developments are imposing new profit-making responsibilities upon engineering management, in the opinion of a Minneapolis-Honeywell executive.

"The launching of new products under a fast product obsolescence situation requires better evaluation of the probable success both as to techniques and as to market," George M. Muschamp told a regional American Institute of Electrical Engineers conference recently in Charleston, W. Va.

Mr. Muschamp, vice-president-engineering for Honeywell's Industrial Products group, said the profit plateau of marketable product "is becoming shorter and shorter as the entire time axis shrinks."

Projects and Costs

"This means several things to engineering managers," he continued. "First, there is less chance that a long period of profit-taking will allow initial engineering investment to be recaptured. Thus, greater selectivity as to projects and closer control of their costs will be necessary.

"Also, the economic factors, including tooling and product cost, became more acute in terms of both direct dollars and timing. This means closer integration of industrial engineering into the development process.

"Nothing is more devastating for an engineering manager than to have a product become obsolete before it reaches the market."

Keeping up-to-date on the technology involved with the design and manufacture of his products, and with the technology of the fields in which they are used, presents a "real challenge" to the engineering manager, Mr. Muschamp said.

"While the old saying that there is no substitute for experience is still valid, it is often more significant that there is no substitute for knowledge," he added.

Five Ways to Keep Ahead

The Honeywell executive listed five ways in which engineering managers can cope with the high rate of technological change:

1. Concentrate on acquiring new knowledge in his fields of interest.

2. Be prepared to meet increasingly rapid product obsolescence.

3. Work more closely with the sales department in justifying product development so as to minimize failures.

4. Tighten coordination between design engineering and industrial engineering to generate profits necessary to fund new product programs.

5. Make maximum use of automatic engineering aids.

EDITOR'S NOTE: Mr. Muschamp's comments emphasize once more the importance of coordinated effort among the various branches of engineering within an organization. Certainly the design engineer has his problems and he can do much toward solving them through developing knowledge about the prospects for the products he designs. But ability to act quickly on "changed signals" is a Plant Engineering and Production Engineering responsibility. Plant managers must avoid (through cooperation and discussion) the old Russian Roulette game of "painting oneself into the corner." Plant facilities must be kept as flexible as possible to meet demands for new products and processes that are sure to come.

Dialogue:—Vice President to Plant Engineer

Efficient Power Production

Vice Pres.—*"Nice going, Wilson. We really put the pressure on you for power—to get this season's orders filled. One unscheduled downtime would have thrown us for a loss. Tell me . . . how'd you do it?"*

Plant Eng.—*"Well . . . after our last experience, we called in FULBRIGHT LABORATORIES. They made a plant survey . . . analyzed our conditions . . . determined the cause of our troubles . . . and submitted corrective recommendations.*

"We immediately took their recommendations . . . installed their service . . . and carefully followed their dosage instructions.

"Our water problems have been controlled . . . . the power plant is working perfectly . . . and the boiler inspector says it's the cleanest equipment in this area.

"One thing we found out for sure, Mr. T.— . . . FULBRIGHT consultation doesn't cost . . . it PAYS!"

The technical proficiency of FULBRIGHT LABORATORIES in the sciences of industrial water treatment for boiler and cooling water systems is continually attracting *new* clients to our list of hundreds of major industries in the Southeastern States.

Why not make YOUR water problems OUR responsibility? A request for a discussion of these problems will be promptly answered by our field representative or one of our executives. Remember . . . FULBRIGHT consultation doesn't cost . . . it PAYS!

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Two Alabama Engineers Discuss Latest Methods of Planning and Scheduling

The Critical Path Method

By C. P. BOLVIG and N.T. WILLIAMS

Mr. Bolvig and Mr. Williams are employed by The Rust Engineering Company in Birmingham, Alabama. Mr. Bolvig holds a Bachelor of Science degree in Chemistry from the Virginia Military Institute and a Master of Business Administration degree from the Harvard Business School. Mr. Williams obtained a Bachelor of Engineering degree from Vanderbilt University and Master of Science degree in Civil Engineering from Georgia Institute of Technology.

Part 1 of a Series of Case Studies Showing How to Improve Plant Planning

IT HAS BECOME increasingly apparent in this highly competitive industrial age, where labor costs have spiraled upward, that management must constantly seek new cost and timesaving devices. There is a genuine need for critical appraisal of existing methods and occasional departure from traditional procedures. The *Critical Path Method* is one such departure which is showing great potential as a management tool for more efficient planning, scheduling, and control of construction projects.

This first article describes the CPM and tells how it works. A case study, dealing with the application of the CPM to a specific project will follow in later issues. The case study will cover the design and installation of a 250 ton/day recovery boiler system for the Coosa River Newsprint Company. A contract for this work was awarded to The Rust Engineering Company of Birmingham, Alabama on August 23, 1961, and is scheduled for completion on or before January 31, 1963.

The critical path method was originally developed by an engineering group from E. I. duPont de Nemours and Company and Remington-Rand UNIVAC. We will describe how this method has been implemented by Rust, show how a project is controlled, and tell why we feel the CPM is a far superior management tool in comparison with traditional methods.

Traditional Methods

It would be more definitive at this point to digress from an explanation of the CPM to outline the traditional methods utilized in planning and scheduling a large construction program and to point out the limitation of such a method.

The system most commonly employed utilizes bar charts or some variation thereof. Figure 1 is an actual summary bar chart schedule of off-site facilities for a new $30,000,000 fertilizer plant for Armour Agricultural Chemical Company at Fort Meade, Florida.

The relationships that exist between each activity to be performed is difficult to determine from a glance at this chart. For example, assume that the delivery of structural steel for the dry rock storage building is delayed four weeks:

Will this delay the completion of the entire project?

How much delay would result?

What can be done to offset this delay?

What other work will be delayed as a result of the steel delay?

Should we hold up delivery of equipment?

If so, how much?

If it is feasible to expedite certain jobs to make up this delay, can it be done? Which jobs?

By a slow process we can obtain reasonable answers to the preceding questions, but not without first reconstructing the original thought process that underlies this graphic representation. This is often complicated by the fact that the individuals that developed the chart are not available for immediate consultation.

Wouldn't it indeed be beneficial to have some graphic representation of this project that would make immediately apparent the original thought process — and its logic — that went into the development of this bar chart? Wouldn't it be equally beneficial to be able to recognize at a glance the critical jobs that control total project dura-

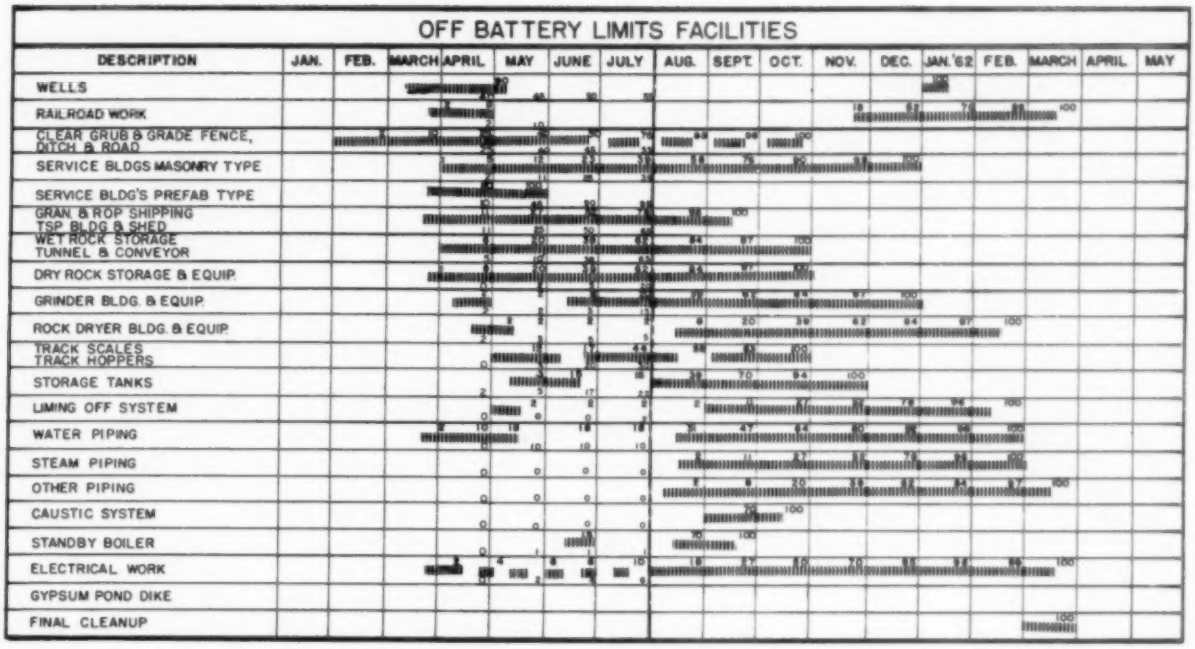


Fig. 1—Bar chart schedule of off site facilities for a Florida fertilizer plant.

tion and how much "slack" time exists in other jobs? The CPM does all of these things — and more.

It should be expressly mentioned at this point that the purpose of this article is not to condemn the use of the bar chart or its users. We merely assert that the CPM is a superior management tool. We emphasize the fact that it is a management tool — not a replacement for management.

Critical Path Method

Possibly one of the best ways to describe the CPM is by using a very simple example. Let us take a do-it-yourself project consisting of the design and installation of four new wooden steps for a house.

The first step is to determine the jobs involved, their logical sequence, and their inter-relationships. Figure 2 shows a preliminary Critical Path Plan for this project.

In this system we represent jobs to be performed by arrows. The length of the arrow has no significance. A job merely starts at the tail of an arrow and is completed at its head. The arrows are arranged in their logical sequence by answering three simple questions.

What jobs must be completed before this job can commence?

What jobs cannot start until after this job is completed?

What jobs can be performed concurrently?

You will notice a dotted arrow in the diagram, which is called a dummy. A dummy arrow does not represent any time duration or any job to be completed. It is interjected to clearly express the logic of the plan. In this case "set block" is dependent upon the completion of "carry materials" and "remove old steps," but "cut materials" is only dependent upon the completion of "carry materials."

There is still another use for

Fig. 2—A preliminary critical path plan.

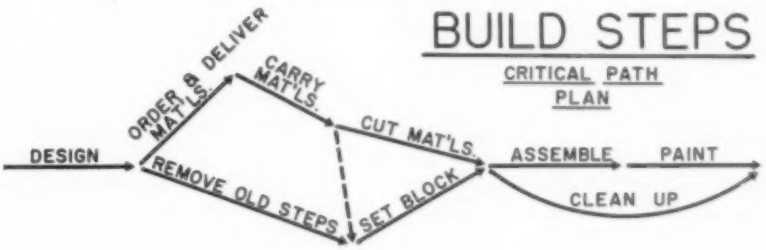
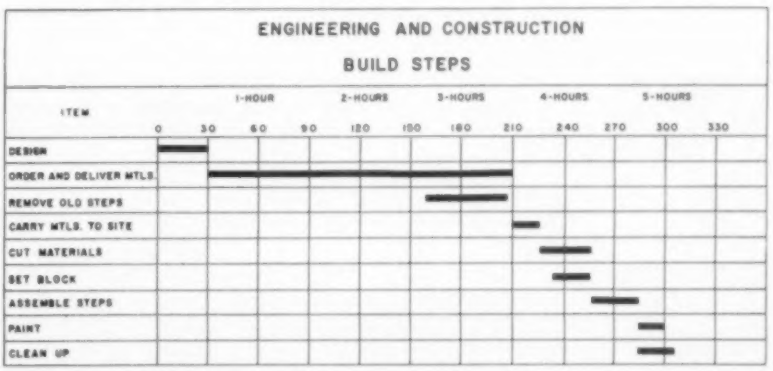


Fig. 3—Bar chart representation of step construction.



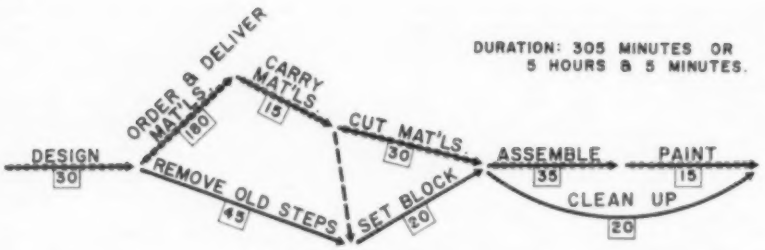


Fig. 4—The estimated time increments must be in consistent units—not days on one arrow and hours on another.

The Critical Path Method is so direct and simple, it may be applied effectively to almost any major maintenance job as well as modernization and improvement. A few well placed arrows (even on the Supervisor's note pad) can help avoid awkward planning and expensive delays.

dummy arrows which has to do with the identification of computer input data. There is little necessity to explain this facet of CPM at this time, since this information will be covered in some detail in a later article.

It should be noted that all the arrows, or jobs, leading into the tail of another arrow must be completed before the next job can commence.

At this stage in the development of a project plan, no consideration has been given to the duration of the jobs by represented arrows. This fact in itself is an important deviation from bar chart diagrams. By their very nature, it is impossible to draw a bar chart without considering a logical sequence of jobs to be performed and their respective durations simultaneously. This is immediately apparent if we look at a bar chart representation of the sample step construction project. (Fig. 3.)

It is important to realize that in the CPM the planning and scheduling phases of a project are separated. This is mandatory on large projects to evolve the most logical and efficient over-all plan. Thus, to this point in the "step" project, we have concentrated solely on the activities to be performed and their logical sequence in relation to one another.

After we have developed a preliminary arrow diagram of the entire project, the next task in our step building project is to estimate the time involved in the completion of each separate job. The units of time used obviously depend upon the total project duration. If the project lasts only several days, the time units would probably be expressed in hours or even minutes. In a project of over a year's duration, either days or weeks would be more suitable. The most important factor is that the estimated time increments must be in consistent units for all activities that make up the project. (See Fig. 4.)

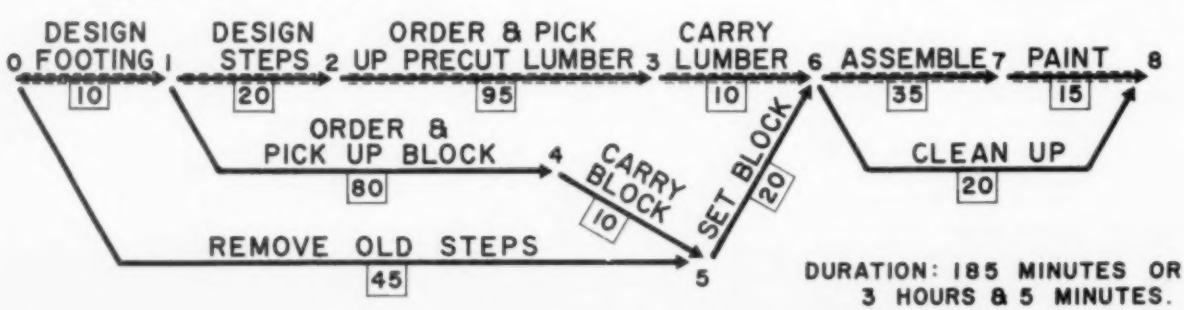
It is now possible to determine the total project duration, which will simply be the longest path in time represented by arrows through the project. It is also apparent which jobs actually control this project duration and are "critical." It is further possible at this time to calculate, by simple arithmetic, the earliest time and latest times that events can occur, and from this determine the "slack" time in jobs not on the critical path.

Should the project duration be unsatisfactory, the arrow diagram can be rearranged. For example, we could rearrange the task to be performed as reflected in Fig. 5, and arrive at an entirely different project duration and list of critical jobs. The little figures, 0, 1, 2, 3, etc., at the beginning and end of each arrow in this diagram are necessary for identification of each activity for computer programming. For example, "Design Footing" is identified as Activity 01, etc.

Obviously the best arrangement for a specific project may depend upon several factors, such as: Is it a rush job? Is time saving more important than money saving? Must the job be coordinated with other activities? But generally speaking, the best plan will be the one that gets best economy of both time and money.

The planner must decide to what extent he should break a project down into arrows and at what point he should rearrange the arrows in the basic project plan.

Fig. 5—The CPM permits manipulation to arrive at most desirable procedure. Note how this diagram differs from Fig. 4.



Essentially, his decision on these matters is determined by experience, familiarity with the CPM, and full understanding of the project objectives. It has generally proven satisfactory to start an arrow diagram with a "broad brush" treatment of the entire project. Arrows are subdivided when it becomes necessary to more clearly express the logical sequence of events, or where it is desirable to break down jobs representing long durations of time for better project control. Rearrangement and modification are expected. As in most planning, there is usually more than one acceptable sequence for events.

Summary

This first article has been an introduction to the principles involved in the CPM. The entire series of articles will show in some detail how the CPM provides a graphic master plan that is sensitive to evaluation of alternative plans. We shall also show how CPM can provide a rapid, accurate, means for ascertaining the effect of changes and for reporting job status.

From the above discussion the reader will realize that the CPM is nothing really new. Responsible management has informally utilized these techinques for many years. What is new, however, is the utilization of automatic data processing equipment to formulate and appraise plans more rapidly, and the formal procedures which provide management with a more consistent tool.

The author gratefully acknowledges use of a portion of a talk by W. F. Edmonds, Chief Engineer, the Rust Engineering Co., Birmingham, Ala., given at the IBM Southern Pulp and Paper Conference on Aug. 17 at Mobile, Alabama.

A Program for Plant Engineering and Maintenance

By R. M. WATSON

Presented at the Textile Maintenance Seminar in Charlotte, N. C. The author has a B.S. in E.E. degree from the University of South Carolina. He has accumulated eighteen years' experience in maintenance and engineering in the textile industry, and served seven years as vocational school teacher.

I LIKE TO THINK of maintenance in three broad categories: Retentive Maintenance, Preventive Maintenance, and Emergency Maintenance.

Retentive Maintenance

Retentive Maintenance is designed to insure proper functioning throughout a normal, useful life. Lubrication, cleaning, and painting are good examples. Most jobs in this classification can be scheduled on a regular, routine basis, requiring no prior inspection and no record keeping.

Other jobs may require some record keeping and more flexibility in scheduling. For instance, if you use a one-coat painting system, you know that generally you get from 4 to 8 years service from a paint job. The painting schedule for the year is then set up by inspection of the areas indicated on the record.

Preventive Maintenance

Preventive Maintenance provides for orderly repair or replacement of worn out material or equipment. As the name implies, the objective here is to prevent shut-downs and/or costly repairs resulting from the malfunction or breakdown of equipment at inopportune times. A good preventive maintenance program demands four essentials: (a) — Inspection, (b) — Planning & Scheduling, (c) — Performance, (d) — Follow-up.

INSPECTION is probably the backbone of the program. First the question arises, "what should be included in the inspection program?" And the obvious answer comes back, "everything that is used is eventually used up and in the process requires maintenance and repair — therefore it should be inspected."

Rather quickly it also becomes obvious that a formal inspection program, with check lists, record keeping, etc., applied to everything in the plant becomes unwieldy and and is impractical. So the formal inspection program becomes a compromise which requires very careful study and consideration by the Plant Engineer.

Economic factors often provide some answers. For example, we do not include loom motors in our formal inspection program. We find that our retentive maintenance program, which consists primarily of lubrication on a regular schedule but which also encompasses visual inspection, keeps our losses at a relatively low level. We cannot justify, economically, a program of regular take-down inspection,

We will have to keep in mind constantly the ever-increasing need for more highly trained men of even greater skill to operate and maintain the equipment in today's modern plant, which daily becomes more complicated.

cleaning and painting.

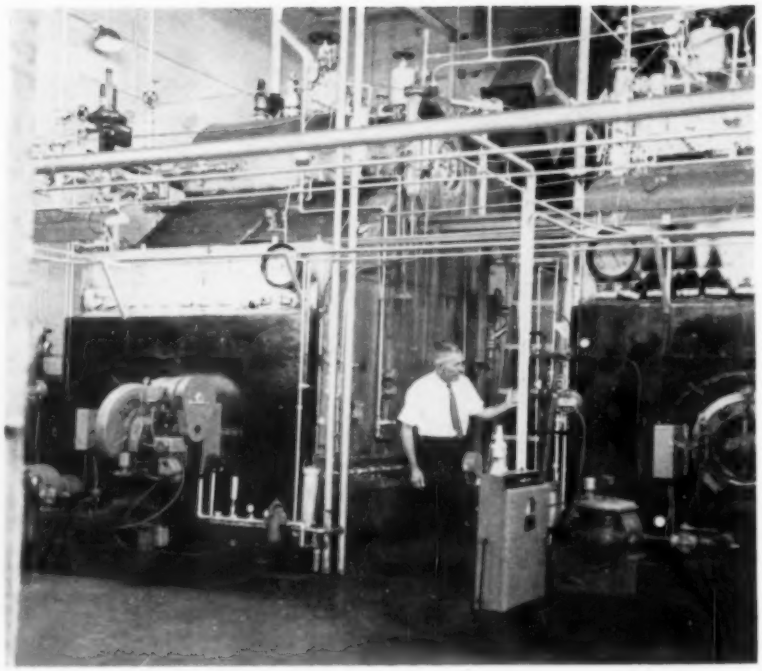
The importance of equipment to the overall operation is also a major consideration in determining the attention it receives. For example, all of our air conditioning equipment rooms are patrolled every four hours. Refrigeration equipment is logged every two hours. Each piece of equipment is set up on the formal inspection program. Fans are inspected quarterly, air washers are inspected annually in addition to the regularly scheduled cleaning program; refrigeration machines are inspected annually, etc. This somewhat rigid program is followed because failure of this equipment would result in serious impairment, and possibly complete shut-down, of manufacturing operations in the areas affected.

A third major consideration is the ultimate effect of a component failure. If failure of a $40.00 bearing might result in several thousand dollars damage to a machine, then that bearing deserves careful attention.

The fourth and final major consideration involves safety. Any equipment whose malfunction or failure constitutes a serious hazard to operating personnel should be included in the inspection program. Examples in this class include all fire protection equipment, fire doors, elevators, electric hoists, motor grounds, overhead traveling cleaners, etc.

Now, let me offer a word of caution. My observation has been that in setting up an inspection program the tendency is to overdo it. It looks fine — and it is nice — to have complete records. But it takes time to make inspections and keep these records. And the labor complement is never sufficient to be burdened with non-essentials. So, before including an item in the formal inspection program, be sure there is a real need to have it there.

Include as much inspection work as is practical in the regularly scheduled retentive maintenance program. There is no reason why the motor oiler can't observe the condition and alignment of the drive while blowing down a motor or lubricating the bearings. He simply has to be trained to *see* what he *looks* at.



Steam and power are high on the list of the plant engineer's responsibilities. Here, the author examines boilers that were recently converted to gas firing.

And another thing — too much inspection can sometimes cause more trouble than no inspection. Some years ago we discovered that we got better service from atomizers if they were left alone than we did when we took them down for regular inspection and repair. Now we take down an atomizer only when it ceases to function properly.

PLANNING and SCHEDULING is the next important step after the inspection program is established. Minor corrections and adjustments, of course, can be made at the time of inspection. Some jobs can be scheduled by the supervisor alone. Major jobs may require consultation between two or more supervisors, the Master Mechanic and the Plant Engineer, and sometimes the Plant Superintendent or Plant Manager.

Such factors as procurement of materials or equipment, time required to perform the work, methods to be employed, coordination with production schedules and other maintenance work, all have to be considered. While other industries apparently are quite successful in using full-time work schedules for maintenance work, I feel that we get better over-all results by requiring each supervisor to do his own prime scheduling, with proper assistance from the Master Mechanic and Plant Engineer — depending upon the magnitude and complexity of the job.

PERFORMANCE of the work is under the direction of the supervisor involved. Here again magnitude and complexity determine the assistance the supervisor can expect from the Master Mechanic and/or the Plant Engineer.

FOLLOW-UP is generally the responsibility of the Master Mechanic, with occasional prodding from the clerk in the Plant Engineer's office. Inspection reports are filed in the tickler file until corrections have been completed. At this time they are transferred to the permanent files and become a part of the historical data.

Emergency Maintenance

Emergency Maintenance of course means the repair or replacement of equipment which has ceased to function. The primary

purpose of the two programs we have discussed is to limit work in this category to a tolerable minimum.

Major breakdowns have a way of occurring at the most inconvenient times such as 2 o'clock in the morning or midnight Sunday night or just before the boss is going to take the Board of Directors through the mill. Seriously though, if just one major breakdown can be avoided by your Retentive Maintenance and Preventive Maintenance programs, the cost and effort that go into the programs will be more than justified.

In concluding our discussion of the Maintenance function, let's briefly review the areas of responsibility. Generally in the Textile Industry, the Plant Engineering Department is responsible for maintenance of (1) All service equipment such as Air Conditioning, Boilers, Air Compressors, Elevators, Water Systems, Sewage System, Electrical System, etc.; (2) Buildings and Building Services; (3) Yards & Grounds, including lawns, shrubbery, parking lots, etc., and usually (4) Some Production Equipment.

Many maintenance functions are still performed by the production departments. But it is my firm conviction that the time has come when the Industry should begin to work toward a goal of establishing a single responsibility for all maintenance functions.

Operating Function

The Plant Engineering Department is not generally considered to be an operating department. So it may surprise you to know that in some plants this department is responsible for the operation of more equipment than any other department.

Included in this function are air conditioning, boilers, water systems, electrical systems, shops, buildings and grounds, fire protection equipment, etc.

In addition, Plant Engineering has the custodial function of looking after rest rooms, building cleaning, plant security and fire protection. Then there are other miscellaneous duties almost too numerous to mention.

From the foregoing discussion it should be apparent by now that the duties and responsibilities of the Plant Engineer extend far beyond his technical work. He has to be a good organizer, administrator and executive. He has to be a teacher. And he should be a good promoter. Let's take a closer look at his responsibilities:

Work Force

First he has to organize and maintain a well-trained disciplined work force to perform the work we've been talking about. Immediately he is faced with problems peculiar to maintenance work. The very nature of the work makes it impossible to apply ordinary methods of establishing work loads.

How then does he establish the size of his labor complement? I try to do it by controlling the back-log of work. The first principle is "never catch up." Always have some work ahead. But don't get too far behind. If the back-log gets too big, it may be necessary to add temporary people or call in outside contractors.

How does he measure performance? I think I have seen all of the usual methods tried and generally proved to be unsatisfactory in some degree.

My observation has been that successful supervisors in maintenance work have at least one thing in common — they learn to judge a workman's performance by the results that he gets. They have to do this, because so much of the work is done in scattered locations by individuals or small groups that direct supervision is impractical.

Supervision

This brings us to the heart of the Maintenance organization — the Supervision. Not too many years back, the Maintenance organization was generally headed by a Master Mechanic who mostly by main strength had learned how to operate the machine tools in the shop and who could "fix anything you send down there." He expected his men to "do what he told them, when he told them, and how he told them." As often as not he didn't want his

Air conditioning equipment is overhauled during the winter, when not needed.

men to learn enough to threaten his position.

Today, the Master Mechanic is just as important as ever — maybe more so. But with the complexity of today's operations, with the advent of air conditioning, refrigeration, automatic controls, electronic drives, more demanding shop techniques, etc., the picture is vastly different. He can't do the job by himself any more.

In the modern plant the Electrical Department and the Air Conditioning Department have caught up with the Machine Shop in size and importance. All have become tremendously more complex. So now he needs men in these departments who not only are highly skilled technicians but who must also shoulder the burden of First Line Supervision — men from whom future Master Mechanics will be drawn.

Where are these men coming from? I haven't been able to find any "pool" to draw from. So they have to be carefully selected and trained. In-plant courses in supervision, short "training schools" offered by various eqiument manufacturers, etc., should be utilized to the fullest. Trade magazines should be provided and the men encouraged to read them. Home study courses should be encouraged. The men should be encouraged to attend appropriate conferences — at company expense.

And the Plant Engineer can provide a lot of this encouragement if he will take time occasionally to discuss their various problems with the men — particularly in regard to theory. By the way, I have usually found that in these sessions I learn more from them than they do from me.

Direction of Functions

The Plant Engineer also has these same responsibilities toward the rest of his organization. In addition, he should assist the Master Mechanic and his other supervisors, in making periodic appraisals of their personnel. This is essential in promoting the growth and development of key men. With the assistance of the Personnel Manager and possibly the Plant Manager, he should also appraise his men periodically and advise them accordingly.

The Plant Engineer is responsible for the direction of all the important functions of his department mentioned above. But he should always keep in mind and constantly remind his entire organization that theirs is a service organization whose every effort should be directed toward keeping the plant running and producing a quality product at a minimum cost. He should direct his department accordingly.

Engineering

At last we get down to Engineering. It should be obvious by now that the Plant Engineer as an individual has not enough time left to do major design work. However, he does consult with outside engineers and architects on major work and does many smaller jobs himself. He prepares cost estimates. He prepares contracts and specifications. He acts in the capacity of Resident Engineer on major construction and installation projects. And probably most important of all, he applies his engineering knowledge to the daily problems that arise in the operation and maintenance of a very complex industry. His problems are so diverse, he must be well-grounded in the fields of Electrical & Mechanical Engineering and have at least a nodding acquaintance with Civil & Structural Engineering. And even a smattering of Chemistry comes in handy.

Liaison With Management

Finally we come to the relationship of the Plant Engineer to the rest of the Management. What are his responsibilities here?

First, he is the source of information and advice on technical problems within his area. It is his responsibility to lend all possible assistance in working out ideas for improvements in processes or equipment. It is also his business to discourage ideas which are basically unsound.

He should advise with Management on the purchase of new and used machinery.

He should keep Management informed as to the condition of the physical plant.

He should keep Management informed as to the capacity of utilities and service facilities.

He should advise with Management in working out a sound and comprehensive maintenance and operating budget.

He should show intelligence and initiative in his contracts with Management. Presentations should be prepared carefully and presented aggressively. How many times have you heard such comments as "I told them that we needed a new boiler but they didn't do anything about it. Won't be my fault if the plant shuts down."

Well, I'll tell you one thing — he won't get a new boiler that way. And another thing — with that defeatist attitude, negative thinking, hedging and looking for a crutch, he is not doing himself any good, he's not doing his company any good, and he's not doing any good for Plant Engineering.

Finally he should do a good job of Selling to Management. Generally, Management's concept of the Plant Engineering Department has not changed much in the last 20 years. A big reason for this is that those of us in position to do so have not made Management aware of the tremendous potential value of this department to the plant.

Conclusion

In conclusion, I should like to mention a few items which in my opinion should be put at the top of the list of things we need to get across to Top Management.

A Plant Engineer is not a Master Mechanic and a Master Mechanic is not a Plant Engineer. The jobs are entirely different, yet each supplements the other. In some industries there is room for both and a great need for both.

The industry needs to pay adequate salaries to attract and hold competent plant engineers and master mechanics and foremen in this Department.

Adequate clerical help should be provided to maintain the records and lessen the burden of paper work on the supervisory force.

We will have to keep in mind constantly the ever-increasing need for more highly trained men of even greater skill to operate and maintain the equipment in today's modern plant which daily becomes more complicated.

Virginia Institution Increases Capacity with Minimum Expenditure

Heat Exchanger Solves Hot Water Problem

THE MANAGER of the laundry at a penal institution in Virginia was faced with a growing volume with a water heater simply too small for the present job. No use asking the administrative board for a new storage heater, because there was absolutely no room for any unit larger than the existing water heater in the extremely crowded room adjacent to the laundry.

The only apparent alternatives seemed to be to process over 4,000,000 garments a year at the extra cost of special chemical additives designed to aid production washing in cold water (although the manager knew he couldn't maintain quality standards without hot water). Also, a double shift would greatly increase the cost of the staff, even if the warden could be persuaded to authorize the young prisoners to a double shift.

A visit to a commercial laundry where the performance of a heat recovery installation was witnessed offered exciting new possibilties. The enthusiasm of the laundry manager was related to the consulting engineer who made a thorough investigation.

The volume of soiled wash water was found to contain recoverable heat energy in sufficient amount to make installation of a heat exchanger practical.

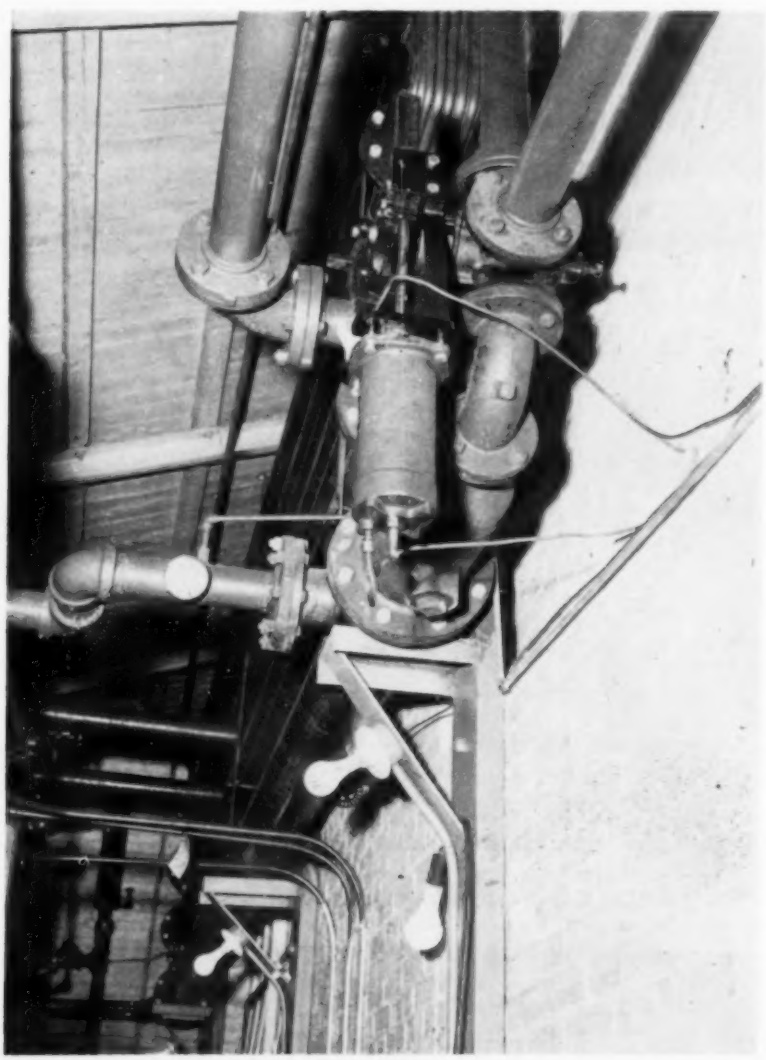
Before writing the bid specifications, the engineer investigated the popular designs of heat enchangers used to reclaim heat from laundry waste. The Ludell Manufacturing Company could furnish each of three designs. These designs were evaluated as follows:

1. Gravity flow pit reclaimer. Low performance, impossible to keep clean. Detrimental to morale of inmates to clean these filthy pits, for self-respect is important in rehabilitation.

2. Water box exchanger with hinged doors and ramrod. Better performance, but has declining efficiency as lint accumulates at each tube sheet. Still requires dirty manual cleaning. No manufacturer (including Ludell) would guarantee performance on a continuous basis. No space available for this design.

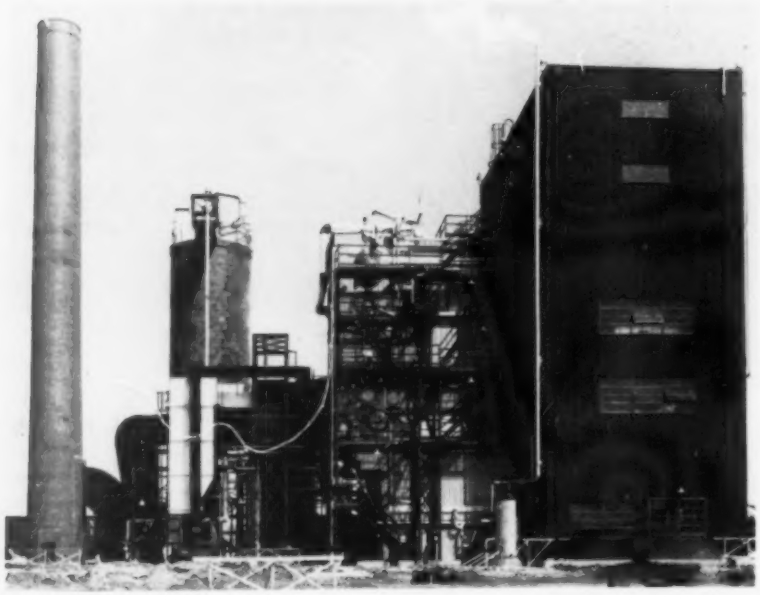
3. Automatic backflushing continuous tube system. Guaranteed temperature rise and guaranteed automatic self-cleaning. Requires only simple gutter screen to protect pump. Sectional design would fit high and flush against the wall under the slope of the roof.

A Ludell System was installed to specifications for preheating 7500 gph of incoming water from 40 F to 125 F when supplied with 10,000 gph waste water at 135 F. The laundry has had more than enough hot water since the reclaimer has made the hot water heater twice as effective. The instant availability of hot water has spurred production. While the volume of work has continued to grow every month, the washroom is usually clear of soiled work by noon.



Outdoor Industrial Power Installation at Brandenburg, Kentucky

Steam Generators for Olin Mathieson



See large illustration on front cover

OLIN MATHIESON Chemical Corporation has completed installation of a new steam generator at its Doe Run Plant at Brandenburg, Kentucky. A second identical unit is under construction at the same site. The units are approximately six stories high and enclosed in pressure tight steel encased settings — built out in the open — with only the firing equipment housed.

Steam Generator

The Vogt Steam Generator has a capacity of 165,000 pounds of steam per hour at 650 psig and 750 F total temperature. It is fired with pulverized coal and operates with an efficiency of 85.2%. The boiler setting is of the pressurized furnace design, but it is operated balanced draft with both forced and induced draft fans.

The boiler has a heating surface of 14,050 sq ft and a projected water wall surface of 2,612 sq ft. Furnace volume is 11,760 cu ft. All water wall tubes and the boiler tubes adjacent to the furnace are 3¼" outside diameter and the remainder of the boiler tubes are 2½" outside diameter. The entire water wall surface is made up of tangent tubes. The side walls at the lower portion of the furnace are vertical and the front and rear walls are inclined, forming a hopper arranged to discharge ashes into a United Ash Conveyor Company hopper.

Wide spaced slag screen tubes at the furnace outlet area reduce slag deposits on the boiler tubes. The pendant superheater is of 2,900 sq ft heating surface, made up of 2" tube elements arranged in wide spaced groups, eight tubes each group, in order to minimize any slag deposits on the elements. The elements are kept clean with Diamond Power Specialty Corporation's Type IK retractable soot blower elements. The remainder of the boiler is cleaned with Diamond Power Specialty Corporation's revolving elements (valve - in - head type).

There are four burners, Peabody Type H-26, 4" insulated swing front forced draft registers with center fired gas gun and tertiary type pulverized coal burners. Pulverized coal is supplied by two Combustion Engineering (Raymond) bowl mills. Each burner has a Peabody Type FP gas-electric ignitor and the burners are mounted on a ⅜" burner plate and enclosed with a double insulated casing windbox with top connection for hot air duct. This hot air duct is carried over the top and rear of boiler back to the air preheater.

Air Preheater

The air preheater is of the Air Preheater Corporation manufacture, a shop assembled 16½-HK-44 Ljungstrom regenerative type, 14,-300 sq ft surface, equipped with electric operating cleaning device. The 12" cold end of the elements is of corrosion resistant low alloy steel mounted in baskets for easy removal and replacement. The remainder of the elements (32" at the hot end) are of carbon steel. The rotor is motor driven, but to prevent shutdowns from power failure an auxiliary air motor drive is provided with hand - operated clutch.

Fans & Instruments

The forced and induced draft fans are of the American Blower Corporation manufacture and driven by Terry turbines. The induced draft fan discharges into a Custodis radial brick stack 100 feet high.

Bailey Meter Company's instruments are used in a console type cabinet for combustion control. Brown thermocouple multi - point strip chart recorders monitor the temperature throughout the unit.

Outdoor installations are no problem with Vogt's method of outer lagging attachment. Rain flashing only is needed at corners and where the boiler passes through the building wall housing the control and firing eqiupment. All other standardized details are water-proof by basic design.

MAGNESIA & ASBESTOS

BLOCKS & BOARDS

SHEETS & FIBER

CORK, FELT & WOOL

THERMAL INSULATION

GLASS & CERAMICS

SILICA & MICA

CEMENTS & ADHESIVES

JACKETS & COATINGS

Thermal Insulation • • •

Reference Guide and Buyer's

CATALOGS AND BULLETINS

Reference literature available from manufacturers to help solve thermal insulation problems and apply materials and equipment. Use Reader Service Card on Page 69.

Z-1—Insulation Cements—Form No. 1463, 4 pages, charts thermal conductivity and general recommendations for thickness of insulating cements for various temperature problems. — Industrial Insulation Div. — THE RUBEROID CO.

Z-2—Gilsulate System — Specification Sheet, Installation Instructions, tables and diagrams give engineering data on "Gilsulate" underground pipe insulation.—AMERICAN GILSONITE COMPANY.

Z-3—Moisture-Vapor Barriers — Nokorode Catalog of coatings, rust preventives, industrial mastics, gives descriptions and specifications, and plant applications are illustrated with photographs.—LION OIL COMPANY, Div. of Monsanto Chemical Co.

Z-4—Pipe Protection — Bulletin No. 70161, 4 pages, tells how "Tri-Sul-Lite" (granulated gilsonite) protects hot underground pipes, prevents water from following pipe, and minimizes maintenance. — G. S. ZIEGLER & COMPANY

Z-5—Heat Insulation — Bulletin, 12 pages, presents photographs and applicational data on heat insulating materials, including "Stic-Tite" plastic insulations, blocks, and mineral fiber blankets, for a variety of industrial uses. — REFRACTORY & INSULATION CORPORATION.

Z-6—Flame-Spread Index Ratings provided for every coating, adhesive, sealer and mastic manufactured for weather, fire, corrosive atmosphere and wear-and-tear protection of processing equipment and buildings. — BENJAMIN FOSTER COMPANY.

Z-7—"Mono-Kover"—Bulletin J-660, 4 pages, describes thermal and physical characteristics of a one-piece pipe insulation for service from below zero to 350 F, and explains easy application of the mineral fiber material. Specifications are provided. — BALDWIN-EHRET-HILL, INC.

Z-8—Pipe Insulation—Bulletin IN-39 10M, 14 pages, gives specifications and data for "K&M" Zebra pipe insulation for 200 F to 1200 F, made in large half-sections to speed application. Charts show recommended thicknesses and heat transmission.—KEASBEY & MATTISON COMPANY.

Z-9—Thermal Conservation — Folder, 4 pages, covers insulation solutions for high and intermediate temperatures, heating and air conditioning, low pressure steam, and ice water and frigid temperatures.—MUNDET CORK CORPORATION.

Z-10—Insulation Products—Bulletin IN-244A, 64 pages, gives information on high temperature insulation; plumbing, heating and air conditioning; refrigeration; fire brick, and other products for insulation. — JOHNS-MANVILLE.

Z-11—Urethane Foam — Unarco U-200 Folder & Data Sheets present a new, lightweight, low temperature, rigid urethane foam, having excellent heat and chemical resistance. Ordering information and prices are included. — UNION ASBESTOS AND RUBBER COMPANY.

Z-12—Foamglas—Form FB-108 40M, 20 pages, covers "Foamglas" for building insulation, roofs, curtain walls, core walls, wall linings, perimeters, ceilings, and special applications.—PITTSBURGH CORNING.

Z-13—Insulating Castables—Bulletin 704, 4 pages, describes six types of lightweight castables, with recommended applications and expansion joint materials. — CHICAGO FIRE BRICK COMPANY.

Z-14—Thermoglas—Form No. 6531, 4 pages, presents data on glass fibers for pipe insulation and roll-form for ducts and large surfaces. Lists specifications, physical and thermal characteristics, and applications for temperatures up to 350 F.—THE PHILIP CAREY MFG. COMPANY.

Z-15—Foamed Plastic — Bulletin 11-143-361X, 4 pages, covers Armaflex 22, an improved flexible foamed plastic pipe insulation — its physical properties, thickness, sizes, application and advantages.—ARMSTRONG CORK COMPANY.

Z-16—Firebrick — Bulletin R-38, 36 pages, includes advantages, applications, constructions, and selec-

Directory for the South - Southwest

tion data for insulating firebrick. Illustrated with photographs, cutaway drawings, and diagrams. — THE BABCOCK & WILCOX COMPANY.

Z-17—Jacketed Pipe—1961 Catalog, 5 sections, covers product, engineering, specifications, drawings, and installation of prefabricated insulated piping systems, jacketed pipe units, and related data. — RIC-WIL INCORPORATED.

Z-18—Ultra-Foam—Bulletin, 4 pages, introduces a new flexible foamed plastic pipe covering designed to provide maximum thermal and vapor barrier protection. — GUSTIN-BACON MANUFACTURING COMPANY.

Z-19—Engineered Insulation—Bulletins & Data Sheets are bound to form catalog of industrial insulations, including mineral wool block insulation, utility thermal finish cement, and blanket insulation.—M. H. DETRICK COMPANY.

Z-20—Refractories — Catalog No. 2301-2, 32 pages, tells how the company's refractory products are engineered and "prescribed" to meet given requirements in the heat and power field.—NORTON COMPANY.

Z-21—Masonry Fill—Forms MF-2 & MF-3, 4 pages each, present water repellent masonry fill insulation for cavity walls and for block walls.—ZONOLITE COMPANY.

Z-22—Felts—Form 526 A, 4 pages, contains samples of S.A.E. felt, gives mechanical roll felt specifications, and recommended uses. — WESTERN FELT WORKS.

Z-23—Thermobestos—Form IN-169A, 20 pages, illustrates uses of high temperature pipe and block insulation in power generation and process industries. Explains moisture resistance of the asbestos, diatomaceous silica and lime product. — JOHNS-MANVILLE.

Z-24—Rigid Armaflex — Bulletin 11-156-461X, 2 pages, describes foamed plastic pipe insulation developed for use where pipe covering may be subjected to compression deformation. — ARMSTRONG CORK COMPANY.

Z-25—Low Temperature Spaces — Form FL-104 Rev., 12 pages, shows photographs of "Foamglas" used in food processing plants and similar applications where temperatures range from minus 50 F to plus 50 F.—PITTSBURGH CORNING.

Z-26—High & Low Temperatures — Form No. A-91, 20 pages, catalogues industrial and commercial insulations for high and low temperatures. Photographs show various types in plant applications. — THE EAGLE-PICHER COMPANY.

Z-27—"Fine-Fyber Felt" — Bulletin J-661, 4 pages, presents thermal and acoustical characteristics of a lightweight insulation designed for service from sub-zero to 450 F. Plant photographs show ease of installation. — BALDWIN - EHRET - HILL, INC.

Z-28—Thermal Insulation — K&M Bulletin, 8 pages, catalogs products for a variety of industrial insulation purposes at different temperatures. Illustration and description, features and advantages, properties, thermal conductivity, sizes, given in each case. — KEASBEY & MATTISON CO.

Z-29—Kaowool — Bulletin R-47, 4 pages, introduces a versatile refractory fiber that retains strength to 2000 F, explains construction and expansion joints, and lists applications. — THE BABCOCK & WILCOX COMPANY.

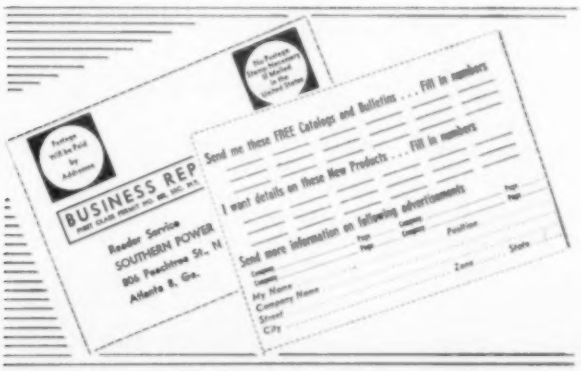
Z-30—Mortars & Cements—Bulletin 701, 4 pages, describes several products for refractory bonding and patching, with illustrations showing method of application. — CHICAGO FIRE BRICK COMPANY.

Z-31—Insulation Coating — Product Data Sheet No. 211 Issue 61-B, "Flintkote No. 54 Insulation Coating," covers heavy bodied non-flammable liquid asphalt emulsion containing insulation materials, designed for spray application.—FLINTKOTE INDUSTRIAL PRODUCTS.

Z-32—Glass Fiber Duct—Bulletin, 4 pages, describes a prefabricated glass fiber duct system for heating and air conditioning, providing positive insulation and other advantages. — GUSTIN - BACON MANUFACTURING COMPANY.

Z-33—"Superglas"—Folder describes pipe insulation with "hinged action," manufactured in one piece and having full length sections to open easily for fast installation, suitable for temperatures up to 350 F, easy to cut and fit.—MUNDET CORK CORPORATION.

Z-34—Flexible Urethane — Hewlex Brochure, 3 pages, explains how Urethane Pipe Insulation offers ex-



FREE READER SERVICE

A full-size reader service card is provided for your convenience on page 69. USE IT to order catalogs listed in this section and for other services offered.

The directory on following pages lists thermal insulation company representatives that serve your area.

USE IT to help find the man you want to help you keep your equipment operating safely and efficiently.

(Catalogs Continued)

ceptional insulation value for a wide range of temperatures, with installation made easier through flexibility. —UNITED FOAM PRODUCTS CO.

Z-35—Superex — Form IN-190A, 12 pages, features pipe and block insulation for service to 1900 F, where high thermal stability and low conductivity are required. — JOHNS-MANVILLE.

Z-36—Fiber Glass Pipe Insulation — Form 1454-A-nb-Bkm, 4 pages, charts dimensional standards and packaging information for fiber glass insulation for iron pipe and copper tubing.—Industrial Insulation Div.— THE RUBEROID CO.

Z-37—Unibestos—Form F76-321, 40 pages, gives comprehensive coverage to Unarco's Unibestos insulation, from laboratory development to plant applications. Tabulates physical and thermal characteristics of various sizes, and gives price.—UNION ASBESTOS & RUBBER COMPANY.

Z-38—Insulating Concrete—Bulletin CA-56, 8 pages, presents data on fireproof insulating roof systems — insulating concrete for galvanized steel decks, formboard, concrete roof decks, and pre-cast roof deck. — ZONOLITE COMPANY.

Z-39—Snap-On Pipe Insulation — Form SO 860, 8 pages, illustrates and describes one-piece molded pipe insulation of fine glass fibers, G-B "Snap-On." Lists sizes and packaging data. — GUSTIN - BACON MANUFACTURING COMPANY.

Z-40—Foamthane—Form FT-2 5M, 16 pages, is a specifications manual for "Foamthane" rigid polyurethane foam insulation for low temperature space installations. — PITTSBURGH CORNING.

Z-41—Ultrafine Insulation—Brochure UFG 1159, 6 pages, features "Ultrafine" thermal and acoustical insulation of extremely fine blown glass fibers with general information and principal uses. — GUSTIN - BACON MANUFACTURING COMPANY.

Z-42—Molded Calcium Silicate — Specifications & Samples available for new "Calsilite-Hi," for soaking heat to 1800 F in both insulation and fireproofing; available in half-sectional, three segmental, and block form. — Industrial Insulation Div. — THE RUBEROID COMPANY.

Z-43—Insulating Cement—the new No. 1 Plus Cement for uneven surfaces, fittings, pipes and valves is effective up to 2100 F. Whiter finish looks better, handles easier and sets smoother. — BALDWIN - EHRET-HILL, INC.

Z-44—Colored Insulation — Bulletin, 6 pages, shows colors offered in "Lagtone," protective color - coding material for piping and ducts, with application by brush, spray or roller on all insulating materials. Specifications included.—BENJAMIN FOSTER COMPANY.

Z-45—Underground Hot Pipes — Trouble - free insulation with Gilsulate — easy-to-use, needs no housing or mechanical sheaths, only needs normal pipe spacing, four types available 220 F to 520 F range. Gilsulate chemically neutral in all soils, dielectric, impervious to mold, rodents and plant growth.—AMERICAN GILSONITE COMPANY.

Z-46—Refractories—Paco high heat duty and super duty plastic refractories. Fire brick, high temperature cement, castables described in bulletins. Installation and engineering service. Free estimates and inspection. — NORTH STATE PYROPHYLLITE CO.

Buyer's Directory

This tabulation lists many of the important thermal insulation suppliers and their representatives in the South and Southwest. Some manufacturers, however, failed to furnish information requested.

AMERICAN GILSONITE COMPANY, Municipal Airport, P. O. Box 15, Salt Lake City, Utah

Alabama, Birmingham 5: George K. Moss Co., 205 S. 32nd St. Phone FA 2-5812

Georgia, Atlanta 5: Applied Engineering Co., 650 Lindbergh Drive, N.E. Phone CEdar 7-7522

Kentucky, Louisville 8: Jackson Engineering Company, Inc., 1463 S. Brook St.

Louisiana, New Orleans 6: Edgar Murray Supply Co., Inc., P. O. Box 74. Phone 524-0481

Maryland, Baltimore 15: Freemire and Associates, Inc., 2802 Ridgewood Ave. Phone MOhawk 4-5626

Missouri, Kansas City 8: Anderson-Stolz Corporation, 1727-33 Walnut St. Phone GRand 1-2024

Missouri, St. Louis: Eagle Industrial Co., Inc., 1021 N. 18th St. (E. St. Louis, Ill.). Phone BRidge 4-1295

North Carolina, Greensboro: Applied Engineering Co., P. O. Box 2311. Phone BRoadway 5-1631

Oklahoma, Oklahoma City: Loeffler-Greene Supply Co., 1604 N.W. Fifth. Phone CEntral 5-6351

South Carolina, Orangeburg: Applied Engineering Co., P. O. Box 506. Phone JEfferson 4-2424

Tennessee, Knoxville: John M. Dooley & Associates, 2508 Sutherland Ave. Phone 2-3655

Tennessee, Memphis: Hurston - Conaway, Inc., 812 S. Highland. Phone GLendale 8-4461

Texas, Dallas 7: J. R. Dowdell & Company, 3160 Irving Blvd. Phone ME 1-5631

Virginia, Richmond 19: Shultz and James, Inc., 9 E. Cary St. Phone MIlton 4-3021

ARMSTRONG CORK COMPANY, West Liberty St., Lancaster, Pa.

Florida, Jacksonville 1: R. C. Roberts, 400 West Monroe St. Phone EL 3-8212

Georgia, Atlanta 8: R. G. Hannam, District Manager, 727 W. Peachtree St., N.E. Phone TR 5-7201

Louisiana, New Orleans 19: J. J. O'Connor, Jr., 3308 Tulane Ave. Phone HU 2-2186

Missouri, Kansas City 8: D. W. Kuhn, District Manager, 500 West 26th St. Phone VI 2-9155

Missouri, St. Louis 10: D. M. Lincoln, Jr., 1919 Hampton Ave. Phone MI 7-3200

North Carolina, Charlotte 3: J. H. Johnson, 1127 E. Morehead St. Phone ED 3-7741

Texas, Dallas 19: J. D. Brock, 2727 Oak Lawn Ave. Phone LA 6-7468

THE BABCOCK & WILCOX COMPANY, Refractories Division, 161 East 42nd St., New York, N. Y.

Georgia, Atlanta 3: R. J. Powell, Candler Building. Phone JAckson 2-5387

Georgia, Augusta: A. D. Teague, 1719 Central Ave. Phone REgent 3-4781

Louisiana, New Orleans 7: R. Onstad, A. M. Lockett & Co., Ltd., P. O. Box 561. Phone JAckson 2-8382

Texas, Dallas 1: G. J. Donaho, A. M. Lockett & Co., Ltd., 1701 Mercantile Bldg. Phone RIverside 1-4155

Texas, Houston 24: R. F. Turcott, A. M. Lockett & Co., Ltd., 3484 West 12th St. Phone UNderwood 9-3711

BALDWIN - EHRET - HILL, 500 Breunig Ave., Trenton 2, N. J.

Florida, Apopka: E. R. Hoff, 1435 Eden Drive. Phone TUcket 6-0821

Texas, Houston 4: K. A. Kuykendall, 4101 San Jacinto. Phone JAckson 3-7397

THE PHILIP CAREY MFG. COMPANY, 316 South Wayne Ave., Cincinnati 15, Ohio

Arkansas, Little Rock: Breeding Insulation Company, 205 N. Arch Street

Delaware, Wilmington: Delaware Insulation Company, 5th & Coleman. Phone OL 4-8826

Florida, Orlando: North Bros., 2715 Regent Avenue. Phone CY 3-9221

Georgia, Chamblee: R. E. Looman, 3806 Donaldson Drive. Phone GL 7-5050

Kentucky, Louisville: Cardinal Industrial Insulation Co., 123 S. 8th St. Phone JU 3-9536

Louisiana, New Orleans 11: Eagle Asbestos & Packing Co., 2500 Earhart Blvd. Phone JA 2-7781

Louisiana, Shreveport: Taylor Contracting & Supply Co., 96 Travis St. Phone 2-4609

Missouri, Kansas City: Jamar-Olmen Construction Co., 1002 E. 19th St. Phone HA 1-2853

Missouri, Prairie Village: J. D. Long, 2908 W. 74th St. Phone EN 2-9232

Missouri, St. Louis 18: Insulating & Materials Corp., 3640 S. Broadway. Phone PR 6-1400

North Carolina, Greensboro: Star Davis Company, 502 Guilford Ave. Phone BR 5-8431

Tennessee, Knoxville: A. G. Heins Company, 112-134 Heins St. Phone 2-2123

Tennessee, Nashville: Breeding Insulation Company, 800½ Ewing. Phone AL 5-0913

Texas, Houston 1: B & B Engineering & Supply Co., P. O. Box 2531. Phone CA 4-9306

Texas, Houston: K. A. Kuykendall, 5123 Sanford Road. Phone PA 3-1626

Virginia, Richmond 21: A. Lynn Thomas Company, Inc., 1814 High Point Ave. Phone EL 8-6785

West Virginia, Charleston: Allied Service Inc., Station A, 160 Spring St. Phone DI 6-0494

CHICAGO FIREBRICK COMPANY, 1467 North Elston Ave., Chicago 22, Ill.

Florida, Tampa 9: John D. Homan, 4825 Sunset Blvd.

Missouri, St. Louis 17: Oswald Refractories Co., 1401 S. Brentwood Blvd.

North Carolina, Greensboro: Paul O Stribling, Jr., P. O. Box 2669

Texas, Houston: Haylett O'Neill & Son, P. O. Box 1166

M. H. DETRICK COMPANY, 111 West Washington St., Chicago 2, Ill.

Missouri, St. Louis 10: Refractories & Furnace Supply Co., 1042 Central Industrial Dr. Phone PRospect 3-3233

Oklahoma, Tulsa: Insulation Services, Inc., 645 W. 41st St., P. O. Box 4695. Phone HIckory 6-6601

Texas, Houston 1: The Industrial Insulators, Inc., P. O. Box 2601. Phone WAlnut 6-4435

THE EAGLE-PICHER COMPANY, 900 American Building, Cincinnati 1, Ohio

Alabama, Birmingham: Shook & Fletcher Insulation Co., 2431 First Ave. South

Alabama, Mobile: Insulation Engineers, Inc., P. O. Box 815

Florida, Jacksonville 2: Thermal Refractories Co., 1430 East Adams St. Phone EL 6-5602

Florida, Tampa: Adamo Insulation, Inc., 19th & Adamo Drive

Florida, Winter Haven: George L. Simonds Co., Fifth St., S.W. Phone CY 3-2171

Georgia, Decatur: Walter P. Rock, Area Manager, 2077 Green Forest Drive. Phone BUtler 9-3783

Louisiana, Shreveport: The Aber Co., Inc., 2632 Levy St. Phone 8-3526

North Carolina, Charlotte 1: Guy M. Beaty & Co., 522 S. Elliott St. Phone ED 3-8625

Tennessee, Chattanooga: Guy M. Beaty & Co., 1106 Carter St. Phone 6-2304

Tennessee, Nashville: Boiler Supply Company, Inc., 490 Craighead St.

Texas, Amarillo: Clowe & Cowan, Inc., 223 West 4th St.

Texas, El Paso: Geo. S. Thomson Co., Inc., 611 N. Campbell St. Phone KE 3-9503

Texas, Houston 27: E. J. Tracey, Area Manager, 3319 Las Palmas, Apt. 3. Phone MO 4-3285

Texas, Houston 21: Precision Insulation Co., Inc., 2931 Holmes Rd. Phone JA 6-3591

Texas, Odessa: Western Chemical & Supply Co.

Texas, Orange: Sabine Insulation Co., Inc., 1111 Polk St. Phone TU 3-8486

THE FLINTKOTE COMPANY, Industrial Dept., 30 Rockefeller Plaza, New York 20, N. Y.

Florida, Jacksonville 11: W. C. Henson, 6438 Swallow Cove Road. Phone RA 4-6585

Louisiana, New Orleans 12: C. M. Abadie, 1221 Carondelet Bldg. Phone CH 2-3183

BENJAMIN FOSTER COMPANY, 4635 W. Girard Ave., Philadelphia 31, Pa.

D. C., Washington 10: William J. Barsh, 3714 14th St., N.W. Phone TAylor 9-4332

Florida, Jacksonville 11: Sheppard C. Bell, Jr., 3817 Bess Road. Phone ELgin 5-4127

Georgia, Decatur: James F. Munson, 2462 Miriam Lane. Phone (Atlanta) 233-7590

Texas, Houston 17: Harvey Lee, Jr. and C. T. Severance, Benjamin Foster Company, 13115 Syndicate Rd. Phone HUdson 7-1200

GUSTIN - BACON MANUFACTURING CO., 210 West 10th Street, Kansas City 5, Missouri

Alabama, Birmingham: J. R. Smith, 1288-A 49th Place South. Phone LYric 2-3463

Florida, Jacksonville: F. M. Quattlebaum, P. O. Box 8408. Phone RAymond 5-9237

Florida, Miami Springs: R. L. Macy, P. O. Box 556. Phone TUxedo 5-1282

Georgia, Atlanta: C. W. Goode, District Manager, 3272 Peachtree Road, N.E. Phone 237-3316

Louisiana, New Orleans: R. C. Ebbert, 6105 Colbert St., Box 12005. Phone 488-2335

North Carolina, Charlotte: P. D. Petris, 519 East Trade St. Phone EDison 3-0453

Texas, Dallas 35: J. L. Mohun, 100 Exchange Park North. Phone FLeetwood 2-8107

Texas, Houston: P. O. Craig, District Manager, 5531 Armour Drive, P. O. Box 4555. Phone WAlnut 6-2671

Texas, Lubbock: R. A. Snyder, 5416 Eighth St. Phone SW 9-4816

JOHNS-MANVILLE, 22 East 40th Street, New York 16, N. Y.

Georgia, Atlanta 3: W. J. Walsh, Dist. Mgr., 101 Marietta St.

Missouri, St. Louis 5: C. B. Hann, Dist. Mgr., 7912 Bonhomme Ave.

Texas, Houston 4: R. A. Stapleton, Dist. Mgr., 3115 Blodgett St.

KEASBEY & MATTISON COMPANY, Ambler, Pa.

Georgia, Atlanta: Keasbey & Mattison Co., 3330 Peachtree Road, N.E. Phone 237-1542

Tennessee, Knoxville 18: C. E. Webb, 5604 Dogwood Road. Phone MUtual 7-2009

Texas, Houston: Keasbey & Mattison Co., Texas Gas Bldg., 2472 Bolsover Road. Phone JAckson 6-3851

Texas, Houston 35: Harold B. Davies, 5434 Creek Bend Drive. Phone PA 3-1020

Texas, Irving: C. E. Alexander, 1009 Mitchell Drive. Phone BL 4-0284

LION OIL COMPANY, A Division of Monsanto Chemical Company, Lion Oil Bldg., El Dorado, Ark.

Georgia, Decatur: Richard L. Hager, D-2, 2477 North Decatur Road. Phone DRake 3-7003

Texas, Houston 18: John W. Walker, 5401 Verdome Lane. Phone OVerland 2-5072

MUNDET CORK CORPORATION, 7101 Tonnelle Ave., North Bergen, N. J.

Florida, Jacksonville 7: 520 East Bay St. Phone ELgin 3-1610

Georgia, Atlanta 7: 339-41 Elizabeth St., N.E. Phone JA 4-0681

Missouri, St. Louis 39: 3176 Brannon Ave. Phone PRospect 2-6466

Tennessee, Nashville: Nashville Insulation Co. (Distributor), 708 Glenrose Ave. Phone AL 6-3307

Texas, Dallas 7: Acme Insulation & Supply Co. (Distributor), 1001 Dragon St. Phone RIverside 8-0726

Texas, Houston 11: 6601 Supply Row. Phone WAlnut 8-2416

Texas, San Antonio: 130 Lombrano St. Phone PErshing 5-7651

NORTH STATE PYROPHYLLITE CO., Box 7247, Greensboro, N. C.

Florida, Tampa: Ed Salmon, 4509 South Clark Ave.

Georgia, Atlanta: McBurney Stoker & Equipment Co., 2110 Peachtree Rd., N.W. Phone 876-4436

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North Carolina, Gastonia & Greensboro: Kincaid Engineering Co.

North Carolina, Hickory: J. L. Goodman & Son

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North Carolina, Raleigh: Joe Moore & Co.

South Carolina, Camden: Craig Roper, Sales Engineer, 2006 North Broad St.

South Carolina, Spartanburg: Brown-Rogers-Dixson

Tennessee, Johnson City: Muse Inc.

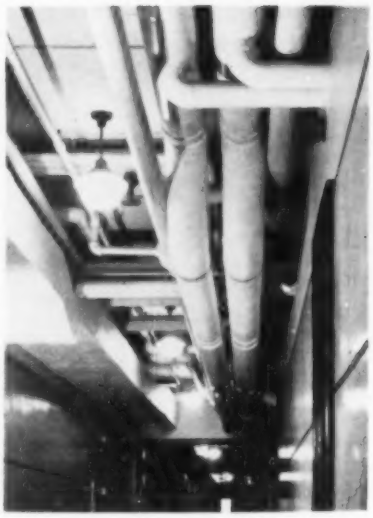
Tennessee, Johnson City: Summers Hardware & Supply Co.

Virginia, Churchland (Portsmouth): Way Fire Brick Co.

Virginia, Roanoke: Deeds Boiler Co., 703 Orange Ave. Phone DI 3-6074

NORTON COMPANY, New Bond Street, Worcester 6, Mass.

Alabama, Birmingham 7: Combustion Improvement Company, Inc., 2915 28th Place, North



Florida, Winter Haven: George L. Simonds Company, Fifth Street, S.W.

Georgia, Rome: Cherokee Refractories Co., Inc., 500 East First Ave.

Oklahoma, Tulsa: Bryant Refractory Company, 1515 West Archer St.

Tennessee, Chattanooga: Cherokee Refractories Co., Inc., 109 N. Highland Park Ave.

Tennessee, Chattanooga 11: W. D. Leetch, Jr., 320 Bass Road. Phone OXford 8-4267

Texas, Dallas 7: Kaiser Refractories & Chemicals Div., 151 Leslie Street

Texas, Houston 36: J. W. Glasford, 6701 Langdon Lane. Phone GYpsy 4-5661

Texas, Houston 1: Kaiser Refractories & Chemicals Div., 2211 Walker Avenue

PITTSBURGH CORNING CORPORATION, One Gateway Center, Pittsburgh 22, Pa.

Alabama, Birmingham: North Brothers, Inc., 4360 Powell Ave.

Arkansas, Little Rock: Ozark Insulation Co., Inc., 3201 S. Elm St.

Florida, Dania: North Brothers, Inc., 5924 Ravenswood Rd.

Florida, Orlando: North Brothers, Inc., 2715 Regent Ave.

Georgia, Atlanta 9: Pittsburgh Corning Corp., Branch Office, 1106 W. Peachtree St., N.W. Phone TR 2-4402

Georgia, Atlanta: North Brothers, Inc., 911 Boulevard N.E.

Georgia, Savannah: North Brothers, Inc., 560 Indian St.

Kansas, Wichita: Kelley Asbestos Products Co., 811 East Waterman St.

Kentucky, Louisville 2: General Insulation & Roofing Co., Inc., 116 North Third St.

Kentucky, Paducah: Triangle Insulation Co., Route 7, Cairo Road

Louisiana, Baton Rouge: The Aber Company, Inc., 5575 Adams Ave.

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Louisiana, Shreveport: The Aber Company, Inc., 2632 Levy St.

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Missouri, St. Louis 18: Insulating & Materials Co., 3460 S. Broadway

Missouri, St. Louis 10: Young Sales Corporation, 1054 Central Industrial Drive

Missouri, Springfield: Southwestern Insulation Co., 1301 St. Louis Street

North Carolina, Greensboro: Starr Davis Co., Inc., 502 Guilford Ave.

Oklahoma, Oklahoma City 2: Mark Blodgett Insulation Co., 200 S.E. Third St.

Oklahoma, Tulsa: Insulation Services, Inc., 645 West 41st St.

South Carolina, Columbia: North Brothers, Inc., Seaboard Park

Tennessee, Knoxville: North Brothers, Inc., 728 Dale Ave.

Tennessee, Memphis 3: Armstrong Contracting & Supply Corp., 648 Riverside Drive

Tennessee, Nashville 4: Breeding Insulation Co., 800½ Ewing Ave.

Texas, Austin 5: Cinbar Engineering Co., Inc., 711 West St. Johns

Texas, Borger: The Industrial Insulators, 624-630 South Locust St.

Texas, Dallas 1: B & B Engrg. & Supply Co., Inc., 2220 South Harwood St.

Texas, Dallas 10: Parker-Fallis Insulation Co., Inc., 1704 Orleans Street

Texas, Houston 2: Pittsburgh Corning Corp., Branch Office, 1607 Jefferson Ave. Phone CApitol 7-1619

Texas, Houston 1: The Aber Company, Inc., 3480 West 12th Street

Texas, Houston 1: B & B Engrg. & Supply Co., Inc., 2900 Washington Ave.

Texas, Odessa: Insulation & Specialties, Inc., Farm to Market Rd. — 1936

Virginia, Norfolk 1: C. E. Thurston & Sons, Inc., 850 Tidewater Drive

West Virginia, Charleston: Allied Services, Inc., 160 Spring Street

REFRACTORY & INSULATION CORPORATION, P. O. Box 790, Norristown, Pa.

Alabama, Birmingham 13: Harry D. Roach, P. O. Box 7525. Phone TR 1-5071

Florida, Miami 32: Voyce-Legier, Inc., 1103 Chamber of Commerce Bldg. Phone FR 7-2561

Georgia, Savannah: J. D. Robinson Co., 13-15-17 Bay St., West. Phone AD 2-8811

South Carolina, Beaufort: Lyle B. Schueler, P. O. Box 971. Phone JA 4-3946

West Virginia, Huntington: C. Wiegers, Jr., P. O. Box 332. Phone 529-2573

RIC-WIL INCORPORATED, Barberton, Ohio

Alabama, Birmingham: Dowdy & Associates, Inc., 1107 Seventh Ave. South. Phone FA 2-5645

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Louisiana, New Orleans: W. H. Grant, Jr., 209 Vincent Bldg. Phone JA 5-1159

Maryland, Baltimore: A. M. K. Kroft, 508 Tower Bldg., 222 E. Baltimore St. Phone PL 2-1559

North Carolina, Raleigh: J. T. Still Co., Inc., 620 W. Jones St. Phone VA 8-3281

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Tennessee, Chattanooga: Dwight L. McNulty, P. O. Box 1066. Phone AM 7-4125

Tennessee, Memphis: T. J. O'Brien Engineering Co., 169 Scott St. Phone FA 4-3531

Tennessee, Nashville: Boiler Supply Co., Inc., 490 Craighead St. Phone CY 7-3504

Texas, Dallas: Nathan Co., 6234 Peeler St. Phone FL 7-0125

Texas, Houston: Texas Engineering Co., 1309 Anita St. Phone JA 3-7431

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Virginia, Alexandria: Ric-wiL, Inc., 128 N. Pitt St. Phone OV 3-1800

Virginia, Richmond: L. A. Bernert, 300 E. Main St. Phone MI 3-0167

West Virginia, Charleston: B. V. Scory Co., P. O. Box 127. Phone DI 3-5971

THE RUBEROID COMPANY, 733 Third Ave., New York 17, N. Y.

Louisiana, Baton Rouge: Gabler Insulation Co., P. O. Box 3341, Istrouma Station. Phone ELgin 7-7310

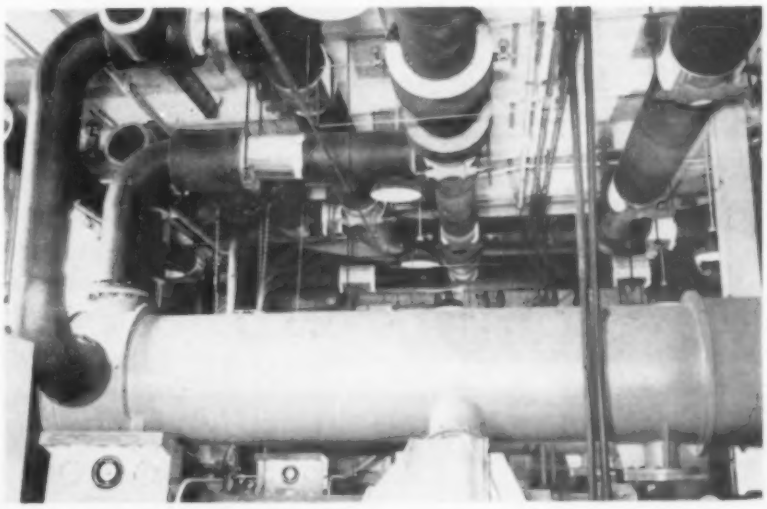
North Carolina, Durham: R. H. Wyatt Co., 115 N. Holman Road, P. O. Box 336. Phone 286-2204

Oklahoma, Tulsa: Insulation Services, Inc., 645 West 41st St. Phone HIckory 6-6601

South Carolina, Charleston: Stafford Insulation Co., P. O. Drawer C. Phone SHerwood 7-1571

Texas, Houston 17: Walter Voigt (Sales Representative), 4025 Gulf St. Phone MIssion 9-7152

Texas, Houston: Precision Insulation Company (Distributor), 2931 Holmes Road, P. O. Box 14398. Phone JAckson 6-3591



Thermal Insulation
Reference Guide for the South-Southwest

UNION ASBESTOS & RUBBER COMPANY, 1111 West Perry Street, Bloomington, Ill.

Alabama, Mobile: Insulation Engineers, Inc., P. O. Box 815. Phone GReenwood 7-0452

Florida, Miami 38: Industrial Insulators, Inc., 255 N.E. 69th. Phone PL 4-0693

Florida, Tampa: Adamo Insulations, Inc., 19th St. & Adamo Drive

Louisiana, Baton Rouge: Aber Company, P. O. Box 130. Phone ELgin 5-7731

Louisiana, Metairie: S. Steve Gorin, 1208 Melody Drive. Phone JAckson 5-8378

Louisiana, New Orleans: Gabler Insulations, 1330 Tchoupitoulas. Phone JAckson 5-1136

Oklahoma, Tulsa: Insulation Services, 645 West 41st. Phone HIckory 6-6601

South Carolina, Greenville: Covil Insulation Co., 129 River Street

Texas, Houston: The Aber Company, 3480 W. 12th St. Phone UNderwood 9-4301

Virginia, Norfolk: C. E. Thurston & Sons, Inc., 850 Tidewater Drive. Phone MAdison 7-7751

West Virginia, Charleston: Allied Services, Inc., Spring & Bulitt Streets. Phone DIckens 6-0494

UNITED FOAM PRODUCTS COMPANY, 2990 Industrial Boulevard, Bethel Park, Pa.

WESTERN FELT WORKS, 4115 Ogden Ave., Chicago 23, Ill.

Kentucky, Louisville 7: Western Felt Works, 4211 Norbourne Blvd. Phone 895-6545.

Missouri, St. Louis 17: Western Felt Works, 1023 S. Big Bend Blvd. Phone STerling 1-1767

G. S. ZIEGLER & COMPANY, 170 Great Neck Road, Great Neck, L. I., New York

Alabama, Birmingham 5: Clary & Associates, Inc., 205 Vulcan Life Bldg. Phone FAirfax 2-3409

Alabama, Mobile: Clary & Associates, Inc., 1803 Calmes St. Phone 479-9277

Georgia, Atlanta 5: E. W. Klein & Co., 3227 Cains Hill Place, N.W. Phone 237-7509

Louisiana, New Orleans: RoCo Equipment Co., 3709 S. Carrollton Ave. Phone HUnter 2-7935

Louisiana, Shreveport: J. P. Ashcraft Co., Inc., 3809 Youree Drive. Phone UNiversity 5-8401

Missouri, Kansas City: C. L. McMichael Co., 2934 Cherry St. Phone JEfferson 1-7235

Missouri, St. Louis: The Hyde Company, 5627 Manchester Ave. Phone MIssion 7-4344

North Carolina, Gastonia: Kincaid Engineering Co. Phone 674-2723

North Carolina, Greensboro: Kincaid Engineering Co., P. O. Box 2752. Phone UNiversity 5-3414

Oklahoma, Oklahoma City: J. P. Ashcraft Co., Inc., 1501 Classen Blvd. Phone JAckson 5-3309

Oklahoma, Tulsa: J. P. Ashcraft Co., Inc., 4129 S. Peoria. Phone RIverside 7-0631

Tennessee, Chattanooga: L. M. Flanary, 938 Volunteer Bldg. Phone AMherst 6-5645

Texas, Dallas 6: J. P. Ashcraft Co., 5643 Dyer St. Phone EMerson 1-6611

Texas, Fort Worth: J. P. Ashcraft Co., P. O. Box 11215. Phone WAlnut 3-4850

Texas, Houston: Powell Equipment Co., P. O. Box 12073. Phone MIssion 4-1484

Texas, Lubbock: J. P. Ashcraft Co., P. O. Box 655. Phone SWift 9-1452

Virginia, Falls Church: Charles W. Campbell, P. O. Box 77. Phone JEfferson 2-6908

Virginia, Richmond: Berkness Control & Equipment Co., 308 W. Cary St. Phone MIlton 3-5357

ZONOLITE COMPANY, 135 S. LaSalle St., Chicago 3, Ill.

Alabama, Birmingham: 2800 Fifth Ave., South

Arkansas, North Little Rock: P. O. Box 294

Florida, Boca Raton: P. O. Box 67

Florida, Jacksonville: 1530 East Adams St.

Florida, Tampa: 35th Street & 3rd Avenue

Georgia, Atlanta 6: P. O. Box 8127, Station F

Kansas, Wichita: Dodson Mfg. Co., Inc., 1463 Barwise Avenue

Kentucky, Newport: P. O. Box 232 Wilder

Louisiana, New Orleans: 2912 Burgundy Street, P. O. Box 3193

Maryland, Beltsville: P. O. Box 354

Missouri, Kansas City 6: 515 Madison St.

Missouri, St. Louis 10: 1705 Sulphur Ave.

North Carolina, High Point: P. O. Box 1308

Oklahoma, Oklahoma City: P. O. Box 6302

South Carolina, Travelers Rest: P. O. Box 217

Tennessee, Nashville: Tennessee Zonolite Company, P. O. Box 601

Texas, Austin 3: 2402 Exposition Boulevard, P. O. Box 6306

Texas, Dallas 22: Texas Vermiculite Co., 2651 Manila Road, P. O. Box 6306

Texas, Houston 8: Vermiculite Products, Inc., P. O. Box 7327

Extra complimentary copies of this Annual Thermal Insulation Directory are available. Write the Editors or use your Reader Service Post Card on page 69.

SOUTHERN POWER & INDUSTRY
a W.R.C. Smith Publication
1760 Peachtree Road, N.W., Atlanta 9, Georgia.

South Carolina Pulp Mill Recovers Forty Million Btu Per Hour

How Bowaters Recovers Heat

INSTALLATION of stainless steel plate type heat exchangers has made it possible for Bowaters Carolina Corporation to recover over 40 million Btu per hour at its Catawba, South Carolina pulp mill. The plate heat exchangers paid for themselves in less than nine months.

The exchangers are located in the pulp digestor blow steam recovery system. These systems create large quantities of steam which is condensed. The resulting condensate is a storehouse of heat energy which can be put to work again in heating process water.

Two things make this system particularly attractive: the initial equipment cost is low, and both desired heating and cooling are effected. Because the condensing of steam is a continuous operation in this system, rather than having to be done within thirty minutes every four hours as is normally the case, less condensing surface is required. Thus, the installation can be smaller, keeping the cost of the equipment down and helping to conserve space.

The hot condensate, which is dirty, is circulated through the heat exchanger to heat clean water for use in the pulp mill.

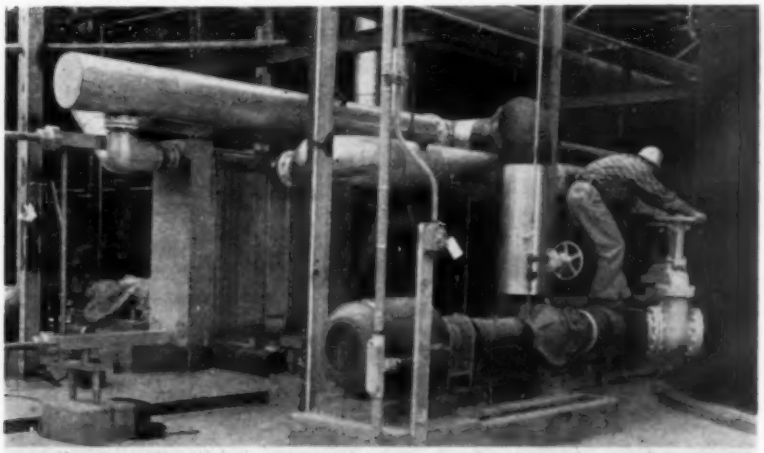
After the condensate has passed its heat to the process water through the heat exchanger, it becomes the cooling medium for the condensing operation. The system cools 1,090 gallons per minute of dirty condensate from 200 to 130 F in the process of heating 1,630 gallons per minute of clean water from 110 to 160 F.

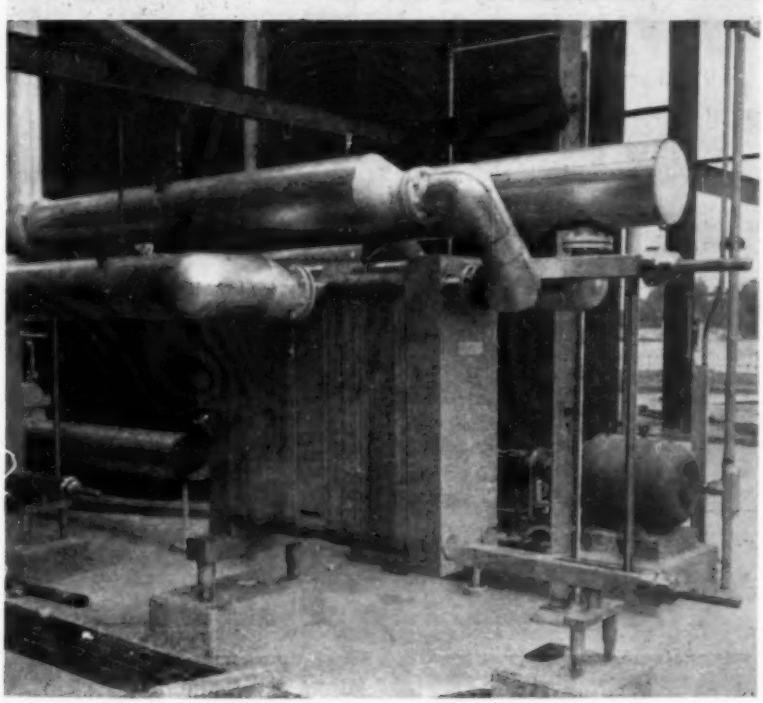
Bowaters Carolina installed two De Laval Model R151 - 1B plate type heat exchangers. Each of these units is capable of heating 408,750 lb per hour of process water. Both exchangers recover together over 40,800,000 Btu for every hour of operation — the equivalent of approximately 40,000 lb of steam per hour.

If the installation is only operated for eight hours per day, five days per week, the savings in terms of average fuel cost alone comes to over $35,000 a year.

Plate type exchangers are more compact, can be constructed of

(*Continued on page 54*)



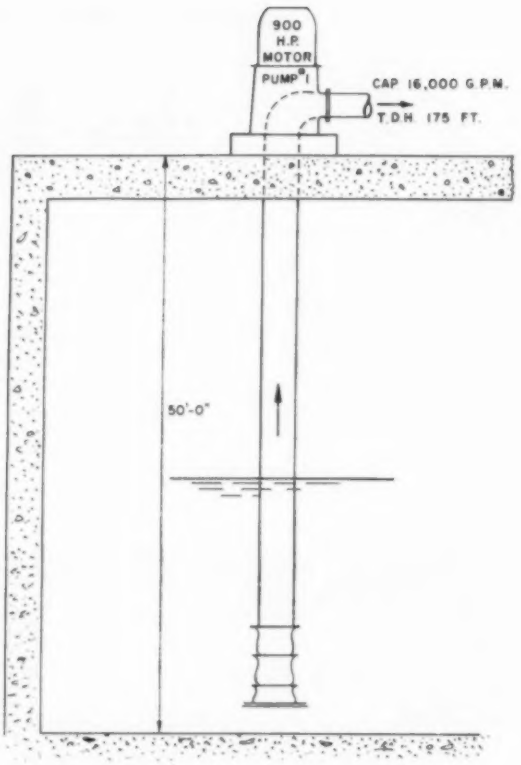


Two views of the plate type heat exchanger at Bowaters Carolina Corporation's Catawba Pulp Mill. The exchanger recovers approximately 45 million Btu per hour of waste heat. The plate exchanger comes completely assembled except for connecting piping. Foundation bolts are not required because the unit is essentially vibration-free.

Centrifugal Pump Clinic

QUESTIONS and ANSWERS
Conducted for SPI Readers

By IGOR J. KARASSIK
Consulting Engineer and
Manager of Planning
Harrison Division
Worthington Corporation



How to Calculate Shaft Elongation

QUESTION:

WE WISH TO THANK YOU for the information which you supplied us in the March 1961 issue of Southern Power and Industry, pertaining to foundation loads exerted by vertical turbine well pumps. If you could find the time to give us your ideas on another problem, we would greatly appreciate it. The problem is as follows:

In a deep setting vertical turbine pump, either oil or water lubricated, where the shaft is stainless or carbon steel and the water temperature is 150 F, how do you accurately calculate the line shaft elongation due to a combination of hydraulic down thrust and 150 F temperature while the pump is running?

We realize that the line shaft elongation due to hydraulic thrust can be calculated from the basic equation:

$$Elongation = \frac{Hydraulic\ thrust \times length}{Metal\ area \times Modulus\ of\ elasticity}$$

But the question remains how to calculate the additional elongation due to the heat.

We thought that perhaps in your many years of experience you might have run across a similar problem. Your ideas on this problem will be greatly appreciated. (W.H.R.)

ANSWER:

AS YOU HAVE STATED, the elongation of a vertical turbine pump shaft is caused by two separate and independent phenomena: first the tensile stress due to the hydraulic thrust and, second, the thermal expansion. Strictly speaking, the tensile stress in the shaft when the pump is running arises from two components: the weight of the shaft and of the impellers mounted thereon and from the hydraulic thrust itself. But in most cases, as you will notice presently, the initial stress caused by the weight and the elongation resulting from this stress is insignificant when compared to the stress and elongation resulting from the hydraulic thrust.

Let us look specifically at the pump described in the March issue of Southern Power and Industry (Fig. 1). The weight of the shaft is given as 1,200 lb. We shall assume that the impellers themselves weigh an additional 400 lb. Let us further assume that the shaft diameter

is 3½" (area = 9.6 sq in.). The modulus of elasticity of the carbon steel shaft is 30 x 10^6. The length of the shaft from the thrust bearing to the bottom impeller is approximately 50 ft or 600". We can now calculate the elongations in question:

$$\textit{Elongation caused by weight} = \frac{(1200 + 400) \times 600}{9.6 \times 30 \times 10^6} = 0.0033''$$

The elongation caused by the downward hydraulic thrust is of a much higher order of magnitude:

$$\textit{Elongation caused by hydraulic thrust} = \frac{15225 \times 600}{9.6 \times 30 \times 10^6} = 0.0315''$$

The sum of these two elongations is of the order of 35 thousandths of an inch. This is quite appreciable and must be compensated for in assembling and setting the pump, so as to avoid interference contact between stationary and rotating parts.

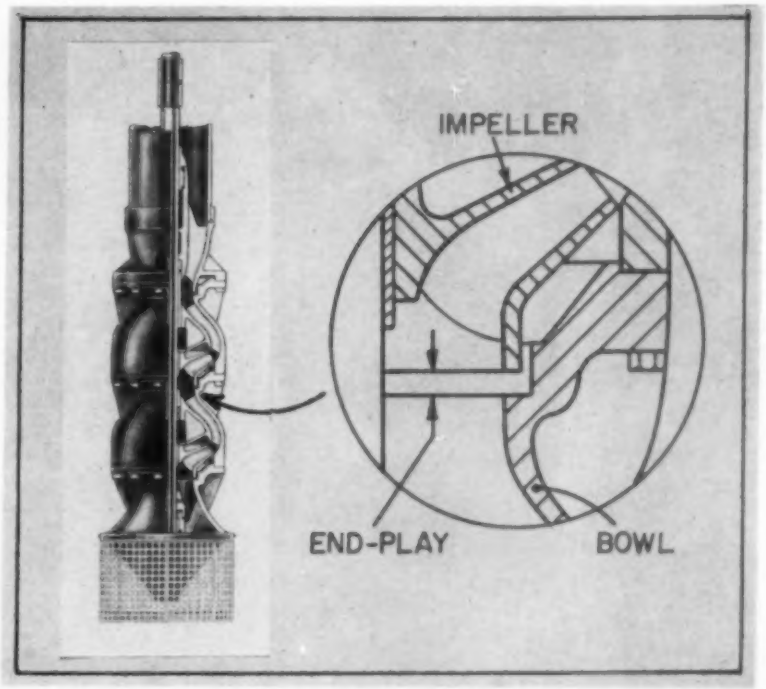
The expansion caused by temperature is completely independent of the elongation of the shaft caused by the downward hydraulic thrust. By definition:

$$E = ctL$$

where E = *elongation in inches*
c = *coefficient of expansion, in./in./deg. F*
t = *change in temperature, deg. F*
L = *length of shaft, in inches.*

In our particular case, the elongation of the shaft caused by thermal expansion will be different depending on whether carbon steel or austenitic stainless steel is used, because the coefficients of expansion are different for the two materials. They are 0.0000065 for carbon steel and 0.0000092 for 18-8 austenitic stainless steel (Type 304). Assuming then that the pump had been assembled at an ambient temperature of 70 F, the change in shaft temperature when pumping 150 F water will be 80 F. The elongation of the shaft caused by thermal expansion will therefore be

$E = 0.0000065 \times 80 \times 600 =$ 0.312" *for a carbon steel shaft.*
and
$E = 0.0000092 \times 80 \times 600 =$ 0.442" *for type* 304 *stainless.*



At first glance, this is quite a bit of expansion. But we must remember that not only will the shaft itself expand because of a change in temperature, but so will the entire pump since it is logical to assume that all parts of the pump in contact with the liquid pumped will reach a reasonably uniform temperature fairly soon after pumping has started.

Since we are more interested in the relative expansion of the rotating and stationary parts, it is obvious that should all pump parts have essentialy the same coefficient of thermal expansion, no relative displacement will take place between stationary and rotating parts.

Thus, if ferrous metals are used for the pump bowls, column pipe, etc., and a carbon steel shaft, both stationary and rotating parts will expand by about 0.312" and no relative displacement will take place. If, on the other hand, the shaft is made of type 304 stainless steel, it will expand more than the rest of the pump by (0.442-0.312) or 0.13" — a little more than ⅛", in other words.

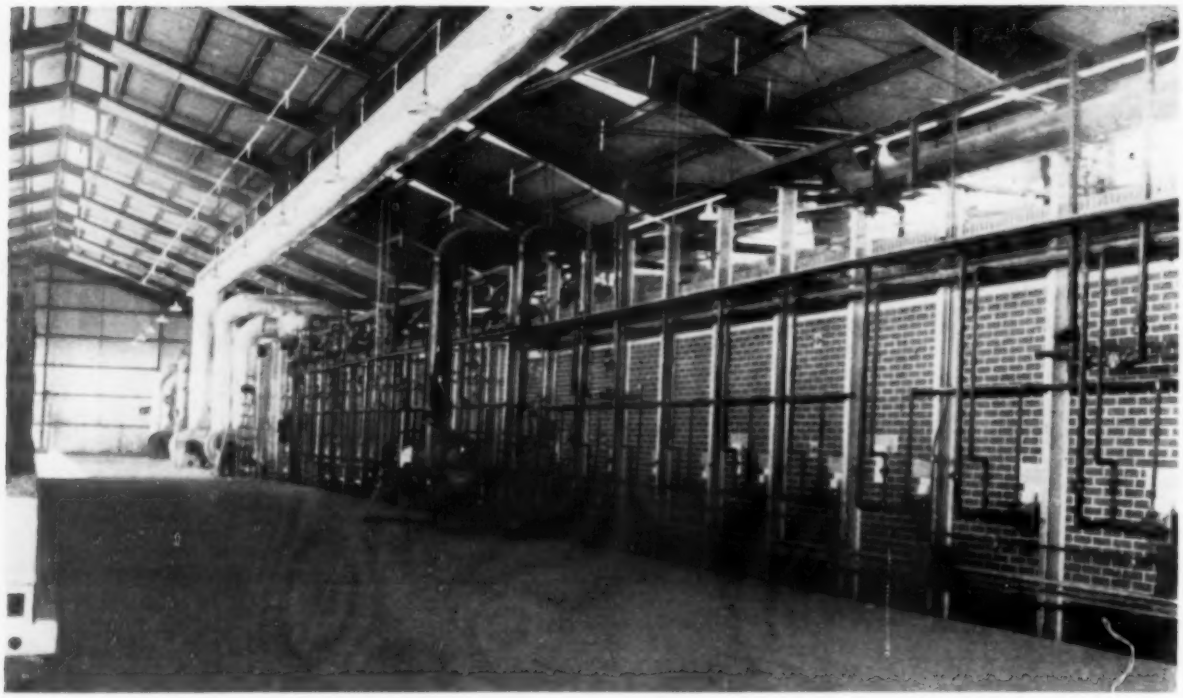
With this combination of pump materials, therefore, the total elongation of the shaft relative to the stationary parts would be 0.0033" (caused by the weight) plus 0.0315" (caused by the downward hydraulic thrust) and plus 0.13" (caused by the change in temperature). The first of these three components is, as we said, negligible. But the total is about 11/64" and unless precautions have been taken to accommodate this displacement of the rotating element with respect to the stationary parts, difficulties would definitely be in store for this pump.

There is essentially one place within the pump where such contact could take place between rotating and stationary parts: the bottom face of the impeller hub which is separated from the mating face in the pump bowl by a vertical clearance.

This clearance, or end-play as it is termed in vertical turbine pump nomenclature, is usually quite generous and can accommodate considerably more than the normal elongation encountered from the effect of hydraulic thrust. (See Fig. 2.) This end-play may run from ⅛" in small pumps to as much as ½" in pumps of the size discussed in this question.

Rating charts for different pumps prepared by the manufacturers

(*Continued on page* 54)



Eighty-One Automatic Burners Assure Constant Temperature in Alabama

Control In Tunnel Kiln Operation

WHERE finished brick must meet high quality standards and precise color specifications, accurate control over every phase of brick manufacture is essential.

At the new plant of Jenkins Brick Company, Montgomery, Ala., the tunnel kiln operation is no exception to overall plant design for maximum control over the entire manufacturing process.

The 285-foot kiln seen here has three basic operational phases: entrance end recirculating, oxidization zone, and firing zone. No less than 81 burners are used throughout the kiln, all designed and manufactured by Hauck Manufacturing Company.

Thirty nozzle-mix-type excess air burners are used in the preheat zone, 48 vari-pressure burners in the furnace zone, two more excess air burners in the oxidization zone, and an additional excess air burner in the entrance end recirculating zone.

All the burners are designed for automatic control to keep margin of error to a minimum, hold down labor costs, and assure constant temperature control.

The burners are combination oil and gas type for easy switchover from gas (the normal fuel) to oil (the standby fuel) should circumstances warrant. The Jenkins plant, now entering its second year of operation, produces 55,000 brick a day.

Welding Trick Cuts Outage Time

A SIX-INCH steam line in a downtown Miami hotel had sprung a leak, and the pipe was located inside a corner of the building where it ran to the upper stories. The leak was in the back of the pipe (in the corner) which meant the pipe would need to be torn out of the wall and replaced — a lengthy job.

However, it was decided simply to shut off the steam, then use the oxy torch to burn out a section of the pipe on its *outside* and directly opposite the inner surface where the pipe was defective.

Removing this outside section enabled the welders to reach inside the pipe and weld up the leaky area, after which the section burned from the pipe's outside was restored as a patch and welded back into place.

This saved precious time, shutting off the heat during a Miami cold spell, and inconveniencing "plushy guests."

By Stanley Clark
Mayo Welding Service
Bradenton, Florida

MANAGEMENT CLINIC

Conducted by ROBERT H. EMERICK, North Charleston, S. C.

How to Estimate Advantages of Air Conditioning

Question . . . . . .

HOW CAN WE TELL positively beforehand, if air conditioning would pay off in our manufacturing plant? How can we calculate such a pay-off in dollars?

Suggestion . . . . . .

THE PROCEDURE for measuring a potential pay-off in dollars is simply this:

Make a list of the benefits of air conditioning, and after each one, set down in dollars the estimated saving per year that it is expected to produce.

To illustrate, say Benefit 1 is an increase in plant production resulting from the greater physical and mental alertness of the employees. The records of plants already using air conditioning show production increases ranging from 2% to 4% over the hot months. The problem of each management, therefore, is to decide on the percentage applicable to the case in hand, and to convert that percentage into equivalent profit dollars.

Another observed benefit, air conditioning reduces employee turnover. Exact records on just why employees quit cannot be taken at face value, for every personnel man knows that reasons given may not be the true reasons. Each Management therefore must make its own estimate of how many of its employees will stop regarding the air conditioned plant across town as a field of greener grass. Such an estimate naturally is influenced by the length and intensity of the summer heat, and the sex of the employees.

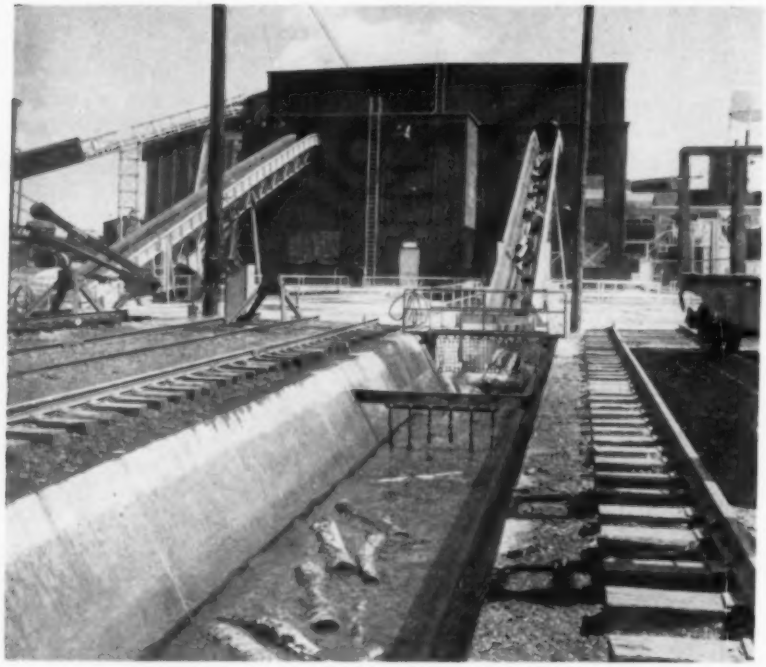
Offered simply as an opinion, we would expect to realize 2% fewer quits among men, 4% among women, the latter being more appreciative as a rule, of air conditioning comfort.

Putting this into dollars, how much does it cost to hire and train a new employee, including productive loss while the new worker is breaking in? The total might be surprising, even if only a few of the quits are eliminated.

Other benefits to be evaluated by Management are these: (a) Improved safety, since physically and mentally alert workers are safer workers; (b) Improved attendance, the plant being more comfortable than elsewhere; (c) Cleaner working areas, producing some saving in housekeeping costs; (d) Improvement of the product, resulting from lowered atmospheric contamination. For example, in precision operations, instituting the control of temperature, humidity and airborne dust has been reported as reducing the number of rejects by 25%. And how much is *each* reject costing the company?

After each benefit has been priced in this manner, we can total the dollars saved, and compare this total with the annual owning and operating costs of the proposed air conditioning installation. The pay-off, and whether it's good, fair, or poor, will show up clearly in this comparison.

Actually, the savings are as easily estimated as the cost. Be sure the cost estimate includes logical figures for: interest on investment, depreciation, taxes, maintenance, power and water. Operating labor is usually negligible for a fully automatic system.



Hard Working Water Saves $16,000 a Year in Labor

IN LAUREL, Mississippi, there's a man-made "river" that flows on and on, with the same water starting upstream that minutes before spilled out downstream.

This "river" is a flume at Masonite Corporation's new plant where green logs enter one end and emerge as versatile hardboards at the other.

Not long ago railroad cars of logs arriving at the plant were unloaded by hand onto conveyors for their ride into the plant. It was a slow, costly operation — with 32 men in three shifts required to satisfy the plant's capacity.

So, Masonite engineers set out to find a better way — and came up with this flume system. Now it's only a 12-man job in two shifts.

The whole idea is a river trip for the logs from an unloading point to two separate ladder rides 800 ft away.

There's a flume on each side of the arriving railroad cars. Cranes topple the loads onto the 12-ft wide by 7-ft deep flumes — and off go the logs downstream to log ladders which elevate them into the chipper.

But what to do about the dirt, debris, sand and bark that the logs shed in the course of their travel?

Again Rex equipment provided the answer — in the form of Rex chain and bucket sand collectors and Rex traveling water screens — actually the heart of the system.

At the downstream end of the flume there are four sand chambers each 10 ft wide by 53 ft long. In each of these chambers, chain and bucket sand collectors remove the sand and other debris which have settled to the bottom. To remove the bark and other floating materials, traveling water screens do the trick.

From the entire flume flow of 60,000 gallons per minute, 600 cu ft of harmful sand an hour and 3400 cu ft of bark per hour are removed — neatly solving the water refuse problem and actually cutting water usage costs.

Yearly savings credited to the flume system amount to $16,000. The log ladders and water cleaning equipment were supplied by Chain Belt Co.

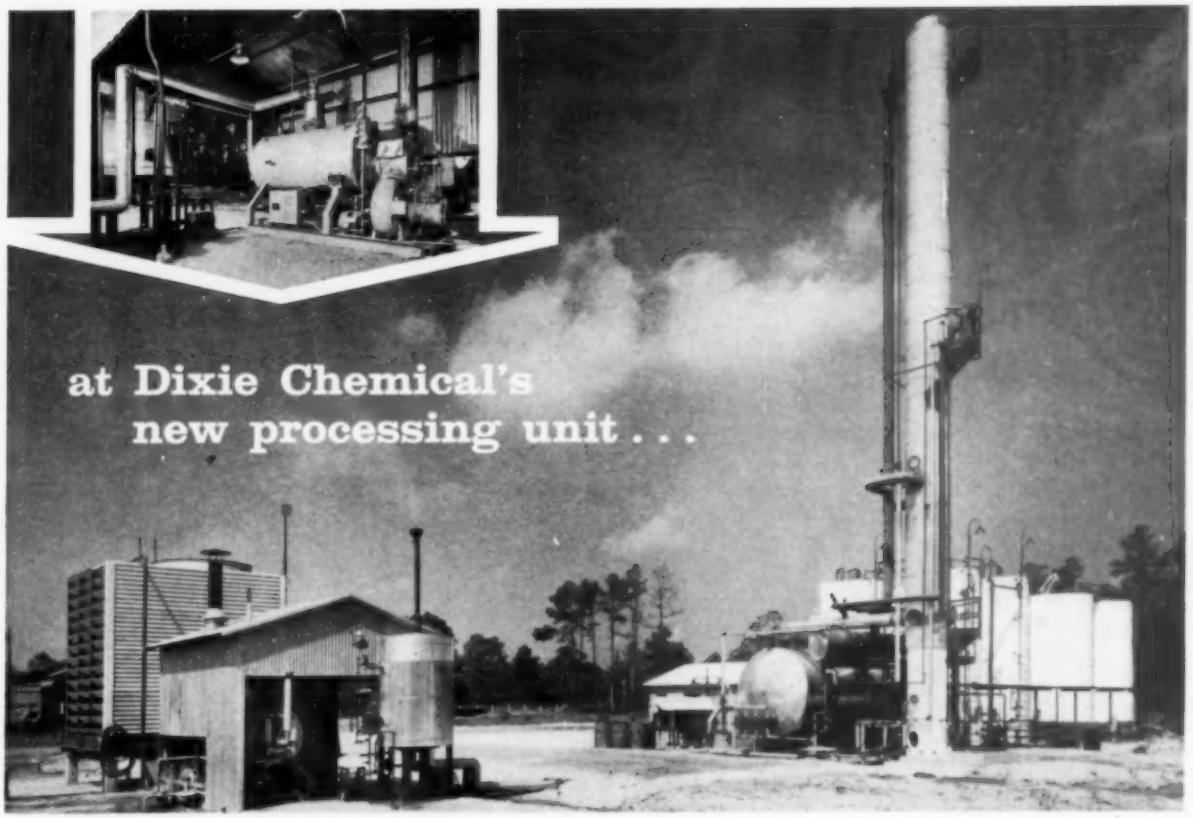
Distribution of Grease

HOW CONVENIENT is the supply and application of grease in your production departments? Some departments require large amounts, but many need just enough to satisfy their machine tool bearings and cams. If each department is furnished its supply of grease in an individual container, it will have on hand one of the available sizes — a 400 pound drum, a 120 pound keg or a 35 pound pail.

Regardless of the size of the container, the lids seldom remain intact. The absence of a lid allows the entrance of paint scale, cigarettes, hardware items and wooden sticks. This produces serious contamination problems. Quite often the grease becomes so contaminated it must be discarded and a new container requisitioned.

Another problem is the transfer of the grease to the application point. The grease gun is the most commonly used method, and the old fashioned hand-suction process is the usual manner of filling the guns. This process is awkward, slow, and disliked by the men doing the filling.

Wagner Electric Corporation of St. Louis, Missouri, has solved the problem. The system used permits production departments to requisition any amount of grease necessary. The oil house attendant fills 14½ ounce non-returnable grease cartridges. The equipment necessary to accomplish this is: a pneumatic grease pump, empty car-



Texsteam Coil-N-Shell generator provides process steam – FAST!

The new processing unit at Dixie Chemical Co.'s Houston plant was designed to handle a variety of chemicals. Specifications called for a process steam unit that could provide a wide range of heat requirements with variations in steam pressure and load at maximum economy.

The unit selected was Texsteam's Coil-N-Shell steam generator.

This versatile, compact steam generator provides Dixie Chemical Co. with process steam—**fast.** And it is economical, too. The Coil-N-Shell is completely automatic and has modulating controls as standard equipment.

No expensive enclosure was required; the prefabricated Texsteam unit was installed inside the unit's utility building, ready for operation.

If your process operation requires steam, it will pay you to investigate the economical, compact Coil-N-Shell steam generator from Texsteam. A new sales bulletin with operational data and diagrams is yours for the asking.

Write: Steam Generating and Heating Equipment Division, Texsteam Corporation, P. O. Box 9127, Houston, Texas.

Steam Generating and Heating Division TXT TEXSTEAM *Corporation*

A SUBSIDIARY OF VAPOR CORPORATION

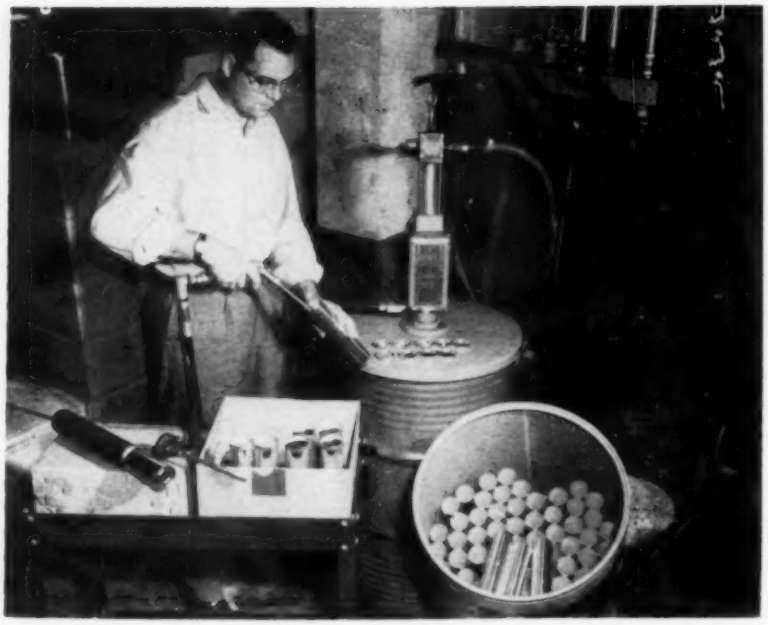
6106

320 Hughes St. • P. O. Box 9127 • Houston 11, Texas • Phone WA 8-5361 • Representatives in principal southwestern cities

tridges (plain foil, no printing, with lids), and inexpensive cartridge type grease guns.

Grease is purchased in 400 pound drums, the most economical size. From a cost standpoint the amount paid for the cartridges is equivalent to the packaging charge for the 35 pound pails formerly used. Now a foreman may requisition any number of cartridges. He is no longer stuck with large containers of grease, and he can take advantage of the fast, clean and efficient method of loading the cartridge type grease guns. The photograph shows the disposable cartridges being filled by the oil house attendant.

By WILLIAM DEHMER
Plant Engineering Dept.
Wagner Electric Corp.
St. Louis, Missouri



Handling Cost Cut 50 Per Cent

A TENNESSEE stove manufacturer faced the problem of holding down costs and at the same time stepping up the flow of cartoned, built-in ovens from second floor storage to first floor shipping.

They used an ordinary freight elevator to lower big, 32" by 32" by 42" cartons. Men with hand trucks picked up the ovens, waited for the elevator, loaded four of them in, and the operator took them down. On the first floor he opened the gates. Then, men waiting with hand trucks picked up the 125 lb ovens and moved them to the truck docks.

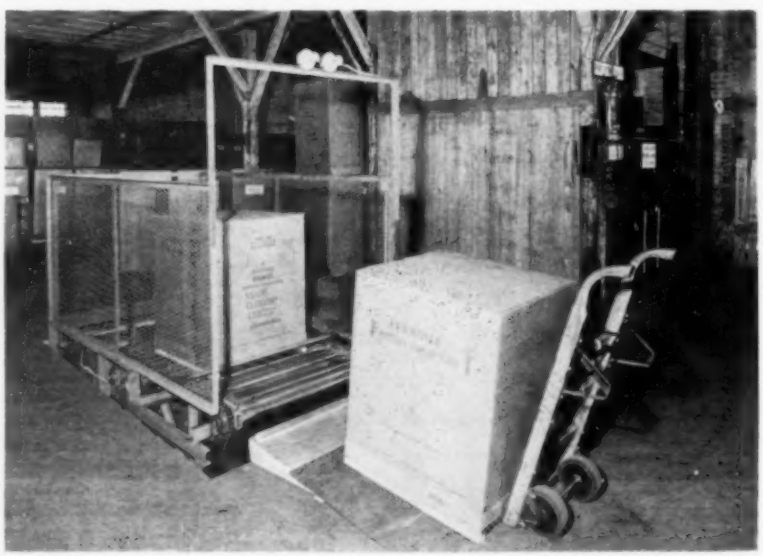
The system was much too slow and tied up too much manpower. Besides the elevator operator, four men did nothing but truck ovens into or out of the elevator. And yet they could only lower one per minute.

An inclined belt was considered but quickly eliminated. The height of the stove cartons would require a very gradual incline. The low incline would not only take up an excessive amount of floor space, but would also require considerable more hand trucking on the first floor. An automatic reciprocating lift was ruled out because its rate would be much too slow.

Then an Escaveyor (manufactured by Standard Conveyor Co.) was considered. The Escaveyor is a self-loading, self-unloading continuous vertical lift capable of moving up to 10 units per minute.

Four platforms traveling 40' per minute could handle four ovens per minute, one at a time. But, with just three platforms, the Escaveyor could handle two ovens at a time, one on top of the other, just as they are stored, and exceed the one-at-a-time capacity by 50%.

The Escaveyor was installed and now — with two fewer men pushing hand trucks — lowers ovens automatically at a steady rate of six per minute.

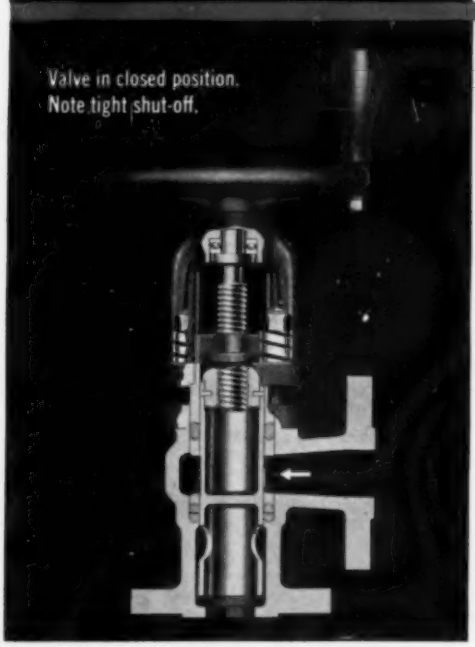


YARWAY news briefs

from **Yarnall-Waring Company,** *Philadelphia 18, Pa.*

BRANCH OFFICES IN 19 UNITED STATES CITIES • SALES REPRESENTATIVES THROUGHOUT THE WORLD
ATLANTA OFFICE: 453 IVEY BUILDING, 3330 PEACHTREE ROAD, ATLANTA 3, GEORGIA

WHY OVER 16,000 ENGINEERS CHOOSE AND USE YARWAY SEATLESS BLOW-OFF VALVES



SAVING IN MAINTENANCE COSTS
FREEDOM FROM BOILER OUTAGES

These are the reasons—proved again and again in thousands of installations over the last 50 years, as *Yarway Seatless* has become virtually "standard" on low to medium pressure boilers.

Check these features that earn such acceptance for this time-honored but truly modern, compact valve:

■ **UNIQUE SEATLESS DESIGN**—full free discharge... combined with drop-tight shutoff... and no seat to score, wear, clog or leak.

■ **BALANCED HOLLOW SLIDING PLUNGER**—made of nitralloy with a "glass hard" surface that resists erosion, high temperatures and sudden shocks. "Polishing" action lengthens life of packing rings.

■ **COMPRESSON YOKE SPRINGS**—heavy coil springs under yoke nuts maintain continuous pressure on reinforced packing above and below valve port to keep valve tight.

■ **BALL BEARING HANDWHEEL**—for smooth operation, easy opening and closing.

■ **NON-RISING STEM.** Valve cannot be opened or closed too quickly. Water hammer is prevented.

■ **STREAMLINED BODY AND YOKE.** Strength where strength is needed—without unnecessary bulk.

■ **CHOICE OF FIVE SIZES—1″ to 2½″,** angle or straightway designs, flanged or screwed ends, available in any tandem combination.

If you are planning purchase of a new boiler, or modernization of present boilers in pressure ranges up to 415 psi, *insist* on protecting your investment with new Yarway Seatless Blow-Off Valves.

They'll give you maximum dependability, minimum maintenance, and satisfaction that is beyond price—all at a very *low* cost per year.

Write for Yarway Bulletin B-427.

Making Use of That Big Compressor

WHEN construction of a large project is over, don't sell that portable air compressor for practically nothing, keep it and save money. The construction people have used it, yes, but when you have dismissed them from the site, keep it for a spare air supply and more so if you have just added a second production unit. They have just broken the compressor part in good, and you will have to use the engine end for a while even though the operating costs run high.

A plant design utilizing a permanently mounted air compressor will not insure you of continuous operation.

If you will plan on a definite place to park the portable air compressors this will complete the first step. At a later date when you want to change to a motor, do so by taking out the diesel or gasoline engine driver unit and add a drive shaft extension mounted on new pillow blocks in its place. Then over the side frame add a suitable metal stand to mount an electric motor.

The motor will need an electric extension lead similar to a home appliance except it will be much bigger — more of the nature of the kind used on a portable welding machine. Then arrange a V-belt drive but instead of using a standard belt use the newer type that has steel cables molded in the belt. They have much greater tensile strength and can be run very tight.

If the motor does not have shaft extension enough, extend it by using a coupling, shaft and pillow blocks. All this seems to be a lot, but when you have completed the rebuilding of the drive you will see you can still be able to put the original metal cover back on and consequently help protect your new motor drive.

You might have to have a belt tightener but this is very simple. The conveyor people have flat belt take-up ends and you can add one very easily. Just assemble on the outside of the V-belts.

One thing that you will eliminate from the engine drive is the pesky loading mechanism which speeds up the engine when the compressor throws back in. The electric motors will take care of this very nicely. It will just reduce its load and say nothing. The noise of acceleration and deceleration will be gone and the unit will run much quieter.

To complete the job add a receptacle and a switch at stations where the spare compressor is needed, and whenever a breakdown occurs you are ready to answer the call and can produce 500 cfm in short order.

By J. A. HAMM, JR.

Pump Clinic

(*Continued from page* 47)

generally list the value of this end-play and charts are also available to calculate the elongation caused by the weight of the shaft and the hydraulic thrust.

Engineers making a pump selection always make a comparison between the caluculated elongation and the end-play to assure themselves that no interference can occur. But it will be noticed from the example discussed here that the relative elongation between a stainless steel shaft and cast iron bowls with steel column pipe is by far of a higher order of magnitude than the elongation caused by weight and hydraulic thrust. Thus, if the pump manufacturer is not informed of the possibility that the pump will handle liquids at considerably higher temperatures than the ambient temperature of assembly, the possibility also arises that interference will occur between rotating and stationary parts.

If the normal end-play is insufficient to accommodate the extremes that may be encountered in operation, some adjustment is possible after the pump is installed, by repositioning the pump shaft within the hollow shaft motor driving the pump.

Heat Recovery

(*Continued from page* 45)

stainless steel, require little maintenance, and show a decided cost advantage when stainless steel construction is necessary.

The flow of fluid streams through the plate type heat exchanger is very similar to flow in the plate-and-frame filter press. The plates in the exchanger are stacked. Hot and cold streams flow through alternate spaces between the plates. The plates in the De Laval units are corrugated which causes turbulence that continuously breaks down any insulating stagnant film that tends to form on the plate surface.

Overall heat transfer coefficient for a typical cooling application with a plate type exchanger is normally in the range of 600-750 and often over 900 Btu per hour per square foot per degree F.

A plate type exchanger can be used for multiple duty, whether it is cooling, heating or regenerative heating and cooling. It is possible to cool two or three different liquids at the same time, or to heat a liquid in one section and cool a second liquid in another part of the same unit.

The plate exchanger can be cleaned in place by counterflow circulation of cleaning solution at 1½ times product flow. In place cleaning is effective for the same reason that heat transfer coefficients are high — turbulence caused by corrugated plate design.

Cost advantage of the plate exchanger is even greater in those cases where the function for which the exchanger was designed is changed and additional surface is required. Heat transfer surface can be increased in the plate unit by adding more plates.

There are some limitations to plate exchangers. For one thing, they can't be used at pressures in excess of 150 psi nor at temperatures in excess of 300 degrees F. Further, they can't be used with true gases.

USED TO THINK EVERY STEAM TRAP LEAKED STEAM.
THEN I FOUND ONE THAT DIDN'T, BUT IT WOULDN'T VENT AIR.
FOUND ONE THAT VENTED AIR, BUT IT NEEDED A COOLING LEG.
DISCOVERED A TRAP THAT REMOVED CONDENSATE AT STEAM TEMP, -MAINTENANCE WAS TOO HIGH.
THEN I FOUND A LOW MAINTENANCE TRAP. IT DIDN'T WORK AGAINST BACK PRESSURE.
AT LAST I FOUND ONE THAT WORKED AGAINST BACK PRESSURE, BUT ITS CAPACITY RATING WASN'T DEPENDABLE.
ARMSTRONG PROMISES TRUE CAPACITIES AND EVERYTHING ELSE. SO I CALLED THEM. THEY TOLD ME TO RELAX. I COULDN'T.
THEY TOLD ME ABOUT ARMSTRONG'S GUARANTEE. WHAT'D I HAVE TO LOSE. I TRIED THEM.
EFFICENCY IS UP, FUEL BILLS ARE DOWN SO ARE MAINTENANCE COSTS. MAN I'M LIVING!

No one trap can do *everything* better than every other trap. Some traps vent air better than others, some remove condensate faster, etc. But, there is no one trap *best* in every phase of trapping. Armstrong has been manufacturing the Inverted Bucket Trap for nearly fifty years, and though the traps have changed with the requirements of the times, the Inverted Bucket principle has remained. For on overall trap performance, year-in and year-out, nothing beats the Armstrong Inverted Bucket Trap. It's a rugged well-built trap that does *more* things better than any other trap. It's guaranteed because it's been proved.

For more details, see your Armstrong Representative and start living . . .

P. S. Like some good meaty reading? Ask for the 48-page Armstrong Steam Trap Book.

ARMSTRONG MACHINE WORKS

8063 MAPLE STREET
THREE RIVERS, MICHIGAN

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Let Westinghouse service your

You can save all these ways when you have a Westinghouse Turbine-Generator Service Contract:

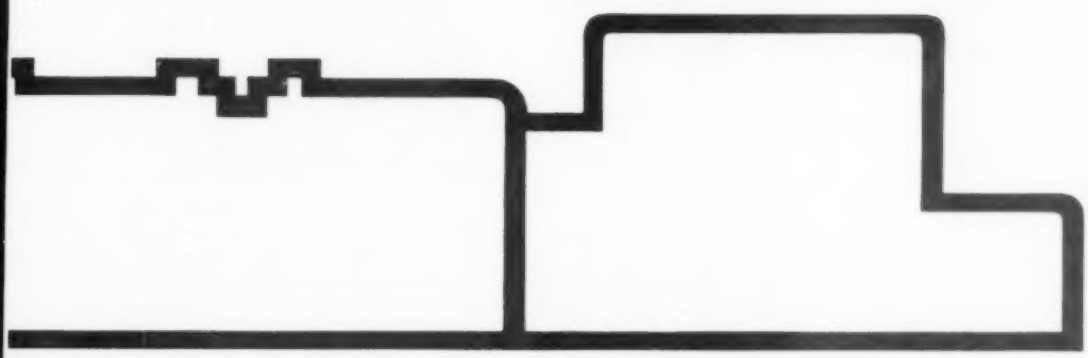
- *Fuel costs may be minimized.*
- *Unscheduled outages may be reduced.*
- *Trained crews cut outage time during overhaul.*
- *Planning techniques cut overhaul time by pre-shutdown ordering of necessary parts.*

Here's what Westinghouse Turbine-Generator Service Contract gives you . . .

As soon as you approve the contract, Westinghouse assigns an engineer to your turbine-generator. As a consulting specialist in turbines and generators, he'll call at quarterly, semi-annual or annual intervals, whatever your contract provides. He'll check your operating records, inspect your turbine-generator equipment, and advise plant personnel on any operating problems. Finally, he'll submit a detailed report of observations, conclusions and recommendations.

The Westinghouse Turbine-Generator Service Contract is not intended to provide routine maintenance. The service complements the activities of your regular maintenance department on a scheduled basis.

turbine-generator . . . and save



At regular intervals, you'll receive a confidential TGSC Service Bulletin from Westinghouse. This bulletin contains reports of operational and maintenance experience of other turbine-generator users. It lets you profit by their experience.

Your contract is flexible and can be tailored to your individual requirements. For example, major inspection and overhaul is provided for in your original contract, based on a detailed outline of all work to be performed. Or your contract can be written to provide for specific work as required.

You determine your needs—Westinghouse does the work.

The Turbine-Generator Service Contract is available in the Westinghouse Southeastern Region. For complete details, contact your Westinghouse sales representative—or write to Westinghouse Electric Corporation, P.O. Box 4808, Atlanta 2, Georgia. You can be sure . . . if it's Westinghouse.

Westinghouse

NEW Product Briefs

. . . there is always a BETTER WAY

FOR MORE INFORMATION ON FOLLOWING ITEMS

Fill in Code Number on Return Card — Page 69

Positioner & Actuator

M-1 A newly-designed axial positioner and a new type actuator that can be combined to make any of six Masoneilan valves serve in any of four different ways is now being made available by **Mason-Neilan,** Division of Worthington Corporation, Norwood, Mass. This four-in-one feature is achieved by making the actuator and positioner invertible, so that the valve may be installed for direct or reverse action, with or without positioner.

The valve is changed from direct (air to close) to reverse (air to open) operation simply by inverting the actuator to change the location of the spring. The specially designed Axial Positioner is mounted on the top of the diaphragm case for direct action, or between the diaphragm case and yoke for reverse action.

Masonry Coating

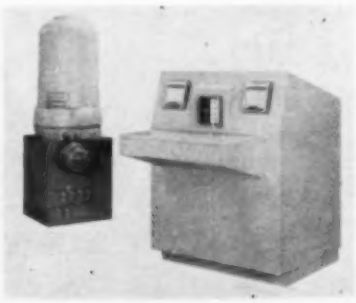
M-2 **The Wilbur & Williams Company,** 650 Pleasant St., Norwood, Mass., announces the marketing of Defensite LG (Liquid Glass), an extremely hard yet resilient water-white, corrosion resistant clear metal and masonry coating.

The product is ready-mixed for immediate use, dries almost instantaneously and adheres to aluminum, stainless steel, brass, copper, galvanizing and almost all commercially used metal surfaces. It is extremely resistant to acids, alkalies, solvents, fuels, as well as to sea water, steam and sustained ultraviolet exposure.

Chromatographic Analyzer

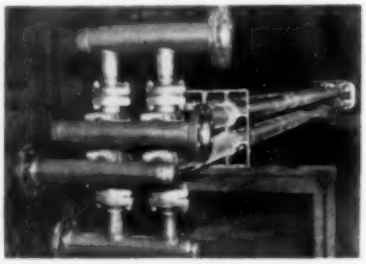
M-3 Featuring trend readout display for compatibility with automatic control, a new chromatographic analyzer made by **The Foxboro Company,** Foxboro, Mass., provides measurements of up to six components on which to base control of process stream composition. Continuous measurement trends are monitored by two pneumatic recorders, each logging the concentration of three components.

Sharp peak definition has been achieved largely through a sampling valve which delivers a uniform slug of gas to the column for each analysis. A special annular slide is spring loaded to prevent carrier gas from leaking into the sample, keeping time lag and dead space to a minimum.



Heat Exchanger Service

M-4 **The Brown Fintube Company,** 300 Huron St., Elyria, Ohio, manufacturer of double pipe and bundle heat exchangers, is now offering completely preassembled and pretested double pipe hairpin heat exchangers.



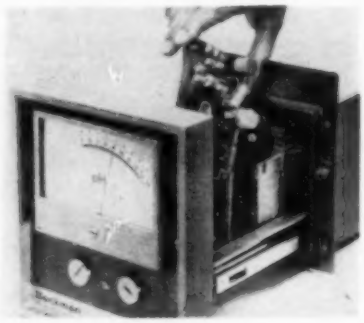
The company's heat exchanger production specialists now furnish double pipe sections, in assembled units bolted together and manifolded to the customer's specifications. All units are given hydrostatic tests to insure satisfactory on-the-job operation. At the plant site, foundations can be erected and piping prefabricated so that a heat exchanger can be on stream in minutes after delivery to the job.

Steam-Water Gauges

M-5 A new line of flat glass, transparent gauges, for steam-water service at working steam pressures of 450 and 650 psi, is announced by **Penberthy Manufacturing Co.,** Prophetstown, Ill. These gauges are designed expressly to provide a continuous, accurate check on water levels in boilers, feedwater heaters, accumulators, condensers, separators, heat exchangers, deaerators and process vessels.

Industrial pH Analyzer

M-6 Marketing of the all-new Model J Industrial pH Analyzer System has been announced by the Scientific and Process Instruments Division of **Beckman Instruments, Inc.**, 2500



Harbor Blvd., Fullerton, Calif. The system includes the pH analyzer, new electrodes, and new electrode mounting chambers.

The pH analyzer employs an a-c stabilized amplifier which provides stability of 0.01 pH/24 hr. over —20 F to +122 F ambient temperature range. Output accuracy and meter sensitivity is ±0.02 pH for the full 0 —14 pH range.

The analyzer is available with both milliampere and millivolt output for use with any potentiometric or current-type recorder. It is also available with millivolt output only.

KEEP UP-TO-DATE
USE SPI
READER SERVICE

See pages 69 & 70

Nylon Pressure Tubing

M-7 **Garlock Inc.**, Palmyra, N. Y., has introduced 9056 Nylon Pressure Tubing, which is a light, strong, flexible tubing which withstands high pressures and is easily installed. Its flexibility eliminates pre-bending and the need for flexible couplings or intermediate fittings.

Other outstanding features include resistance to corrosive oils, greases, dilute acids and alkalies; light weight and high pressure rating (1000 psi and 2500 psi grades). It is odorless, tasteless, non-toxic and fungus-resistant.

We Thermo Electric Thermocouple Extension Wires are Rugged! You can run us through heat, moisture, mechanical abuse, even contaminants — we still give you longer life and accuracy in your temperature measuring systems!

We have so many types of insulations — plastics, fibers, metallic sheaths and armor — that you can choose exactly the right type to meet your applications. Our conductors are extra special too! We're drawn, calibrated and selected in our own wire mill to meet precise quality standards.

WRITE TODAY FOR YOUR WIRE CATALOG W—135

More than 18 pages of information on our whole family, including CERAMO® metal sheathed-ceramic insulated wire and THERMO-CABLE® — 6 to 56 pairs of matched conductors in one cable. Write Today!

*Trade Mark

Thermo Electric

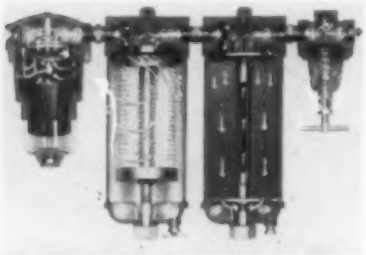
THERMO ELECTRIC Co., Inc., Saddle Brook, New Jersey
In Canada: THERMO ELECTRIC (Canada) LTD., Brampton, Ont.

20 YEARS • *Temperature Measuring Systems and Components*

New Product Briefs (Continued)

Packaged Dehydrator

M-8 A new compressed air dehydrator package for drying air and ridding it of oil and dirt contaminants is announced by **Wilkerson Corporation,** 1667 W. Mansfield, Englewood, Colorado.



Rated at a maximum of 10 scfm at 100 psi, the unit can lower the dew point of air to —100 F, and removal of oil to 2 ppm. It does not require draining since the first stage of the unit has a moisture separator with a built-in automatic sump drain mechanism. The second stage of the unit is a filter that removes dirt as small as 3 microns in size, and oil fumes. Following this is a stage for lowering the oil or moisture dew point. A regulator on the outlet controls the air pressure.

No electrical or water connections are necessary as in most units of this kind. The entire desiccant is visible in the dehydrator through its transparent shell. On the shell is a color-coded chart which visually indicates the condition of the desiccant at all times and tells when it needs reactivating or replacing.

"Boiler With A Brain"

M-9 A new steam generator, known as a "boiler with a brain," that automatically indicates any cause of safety shutdown due to ignition failure, or shortages of water, fuel, electricity or combustion air, is announced by the **Clayton Mfg. Co.,** Box 550, El Monte, Calif.

The new unit delivers 5,000 to 6,000 lb steam per hour at both high and low pressures. In multiple installations it meets requirements ranging higher, depending on application.

This new Model R-175 offers, as standard equipment, a Safety Lockout Annunciator System that operates by means of a group of indicator lamps located on the control panel of the steam generator. In normal operation, none of the indicator lamps are activated.

In case of water shortage, overfiring, or the presence of any factor leading to excessive temperatures, the thermostat lamp lights to point out the cause of burner shutdown. Other lamps indicate such malfunctions as fuel failures, a too-high or too-low oil level in the pump crankcase, damper failures, insufficient forced draft air pressure on gas-fired models, and electrical overloads, shorts or low voltage.

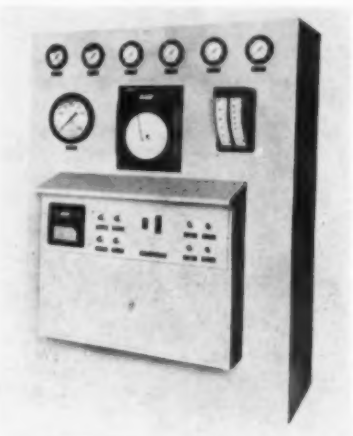
KEEP UP-TO-DATE
USE SPI
READER SERVICE

See pages 69 & 70

Combustion Control

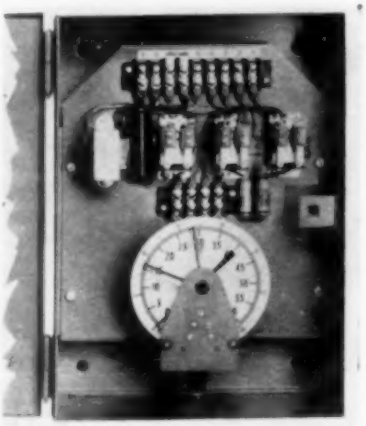
M-10 The **Reliance Instrument Division** of Electro-Mech Corporation, 500 Livingston St., Norwood, N. J., is offering a new packaged combustion control system, which may be used with any register gas and/or oil burner.

In addition to the basic combustion controls, the system offers complete limit protective equipment, flame failure protective equipment, programming equipment, and indicating pressure gauges, as well as complete control valving and piping.



Pump Controls

M-11 Two new pump controls adaptable to elevated or pressure tank systems of all types have been introduced by **Automatic Control Company,** 995 University Ave., St. Paul 4, Minn.



The units are easily installed and provide simple operation by using an electrically - isolated pointer which triggers the control as it indicates pressure variations — thus eliminating trial settings and making it possible to set the gauge in two seconds. The control also stops excessive pump recycling.

Petro Ball Valve

M-12 **Clayton Mark & Company's** Forged Steel Products Div., 1900 Dempster St., Evanston, Ill., recently introduced a Petro ball valve which incorporates fire-safe properties and higher performance ratings for flow control of combustible materials for the petroleum, gas petrochemical, chemical, and other industrial piping systems.

Under simulated fire conditions in the manufacturer's research laboratories, the ball valve's teflon seat sublimes, leaving no residue in the valve cavity. This permits the floating ball design to shift against the chamfer and forms a perfect metal-to-metal seal that withstands a maximum pressure of 1000 psi without leakage.

Despite the additional fire-safe characteristics of the ball valve, the unit costs no more than the company's regular line equipped with teflon seat and buna-N seal.

anco CHEMICAL CLEANING

removes rust, scale and deposits

In-plant service cuts cost, stops down-time

Just 24 hours can mean the difference between shutdown and better profits for you . . . that's all the time it takes for ANCO service experts to rid your heat exchange equipment of rust, scale, grease, or other deposits which build up in your equipment to cut into operating efficiency and bring the threat of costly shutdown.

Anderson Chemical Company's mobile cleaning service can rid your equipment of these harmful deposits safely . . . without interrupting production. These specially fitted mobile cleaning units are constantly on the move throughout the Southeast. They specialize in cleaning boilers, condensers, and other heat exchange equipment.

A call to your nearest Anderson Chemical Company office will bring an ANCO service representative to your plant. He will make an analysis of your rust and scale problem . . . then he will submit a proposal for your consideration . . . all at no obligation to you. You select the time most convenient for the cleaning process . . . nights, weekends, holidays . . . anytime.

Even the most intricate heat exchange system can be cleaned chemically . . . the ANCO way. Special solvents, formulated to dissolve and carry away deposits in your system, are pumped into the system. But ANCO's service doesn't stop there; your ANCO representative also will prepare a preventive maintenance program to keep your heat exchange equipment operating smoothly.

For complete details and an analysis of your water treatment problems, write today. There is no obligation.

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New Products (Contd.)

Bantam Size Regulator

M-13 A very small pressure regulator has been announced by **Wilkerson Corporation**, 1167 W. Mansfield, Englewood, Colorado. This device is

different from other regulators because of its size and cost versus its accurate performance.

Designated "Banti-Reg," the Model 2017 has a gauge port and the Model 2018 is without a gauge port and carries a lower price. The Banti-Reg is made of all brass with a neoprene diaphragm. It is only 2¼" high and 1 7/16" wide. Primary pressures up to 400 psi can be regulated to the range of 5-125 psi secondary pressures.

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Plastic Fishtape

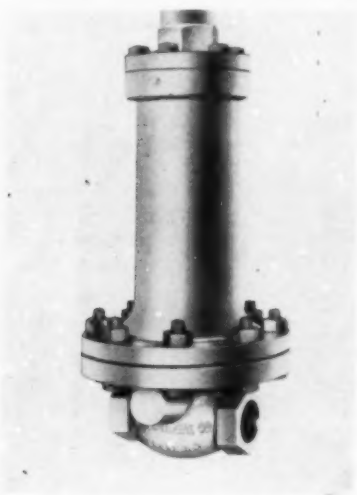
M-14 A new plastic fishtape being introduced by **Cadillac Plastic & Chemical Co.**, 15111 Second Ave., Detroit 3, Mich., combines absolute non-conductivity with the strength and stiffness of conventional steel tapes. It weighs less than one-fifth as much as steel fishtapes and can be easily carried by one man. It can be operated in below-street vaults without hazards, and has been tested at 750,000 volts with no leakage.

The new fishtape is produced from a Cadco plastic copolymer.

In addition to being non-conductive, it is virtually friction free, enabling it to slide through long packed raceways with less effort. It is impervious to corrosion or abrasion and will not develop sharp edges.

Relief Valve

M-15 A new single-seated, spring-loaded, diaphragm-actuated relief valve is announced by **Atlas Valve Company**, 280 South Street, Newark, New Jersey. This No. 1910R, Type E, relief valve is designed for gas, oil and water service. Body is cast iron with nickel alloy or stainless steel trim.



It fills the need for a tight closing relief valve for pressures up to 300 psi. Features include renewable valve disc and "O" ring construction that eliminates stuffing boxes and reduces maintenance to a minimum. The valve is designed for long service with liquids at temperature below 180 F.

Solid State Generator Voltage Regulator

M-16 A complete line of generator voltage regulators and motor-generator set controls has recently been announced by **Auto Marine Laboratories**, 6 East Main St., Ramsey, New Jersey.

These units feature silicon control rectifiers as a non-load sensitive switching medium. Sensing generator output, the regulators apply d-c

Take the legwork out of liquid measurement

Here's practical liquid measuring—the modern way... without roaming all over the lot! Liquidometer Gauges let you inventory distantly stored liquids at a glance.

Completely automatic Liquidometer Gauges can be located as far as 250 feet from tanks. Think what this centralized system can mean in man-hours saved—let alone the additional safety of personnel who no longer have to trudge to, or tamper with, hard-to-get-at tanks.

Simple to install, and requiring no maintenance, Liquidometer Gauges measure virtually all liquids conveniently, continuously, and correctly. There's a type available for practically every liquid measuring application.

For complete details, write

LIQUIDOMETER INSTRUMENTS

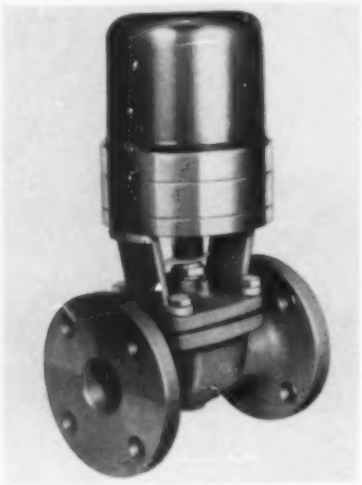
THE LIQUIDOMETER CORP.

Dept. F, LONG ISLAND CITY 1, NEW YORK

voltage to the generator field to maintain constant generator output regardless of load, generator saturation curves, field temperature, etc. The units work from an a-c source.

Top-Entry Ball Valves

M-17 **Hills-McCanna Company,** 400 Maple Ave., Carpentersville, Ill., announces that its top-entry ball valves now are available with electric operators for automatic and remote on-off flow

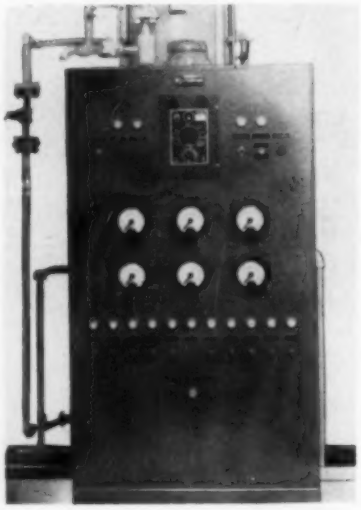


control applications. Operators are sold integrally with the valves or separately for bolting directly to the bonnet of any valve already in service.

Features of the new operators include: weatherproof and explosion-proof construction, stainless steel output shaft, aluminum housing, and hardened steel gear train. Cycle time to fully open or fully close the valves is from 5 to 12 seconds, depending on valve size. The 115 volt a-c is standard. Other a-c or d-c voltages are available.

Demineralizer Controls

M-18 **Barnstead Still and Sterilizer Co.,** 284 Lanesville Terrace, Boston 31, Mass., announces the development of automatic starting, stopping, and regenerating controls for its line of Mixed-Bed, Two-Bed, and Four-Bed Demineralizers in capacities up to



2,500 gallons per hour.

These controls provide automatic regeneration of ion-exchange resins when they become exhausted, and purity safeguards for continuous testing of the demineralized water being produced. Water of sub-standard purity is automatically diverted to waste until the condition upsetting pre-set purity has been corrected. A full tank of demineralized water is maintained automatically with a Level Monitor device activating the equipment when water level in storage tank gets to below a pre-set level.

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Portable Winch

M-19 **Gra-Tite Manufacturing Division,** Gray Properties, Inc., 421 S. W. 6th Ave., Portland 4, Oregon, announces a newly-developed portable winch, which can be operated by one person, and is ideally suited for numerous manual lifting and pulling jobs in factories, plants and industry.

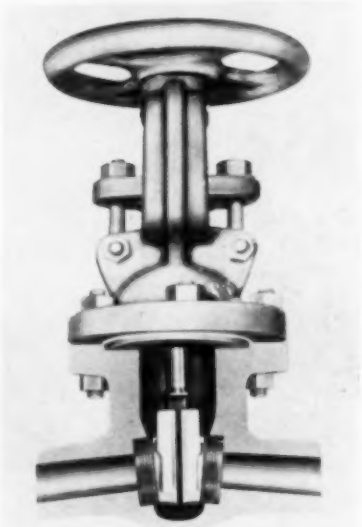
Called the "Mighty Muscle," this compact device weighs only six pounds, but can lift more than a ton. It is designed for such tasks as moving or lifting equipment, tightening assembly line chains, and bending metal.

A spring-actuated pawl and ratchet system provides safety, yet gives an instant, completely free release when desired. The "Mighty Muscle" is equipped with 15 feet of strong 3/16-inch diameter aircraft cable, and a long-wearing molybdenum-filled nylon bearing. Forged steel hooks offer free-swivel action, and the compact housing is of strong aluminum alloy.

"Bi-Valves"

M-20 **The Chapman Valve Manufacturing Co.,** 203 Hampshire St., Indian Orchard, Mass., has introduced the new "Bi-Valve," featuring self-conforming, positive seating and absolute shut-off.

Bi-Valves are designed around a swivel principle which permits the discs to individually conform to seat faces even with severe pipe strain or



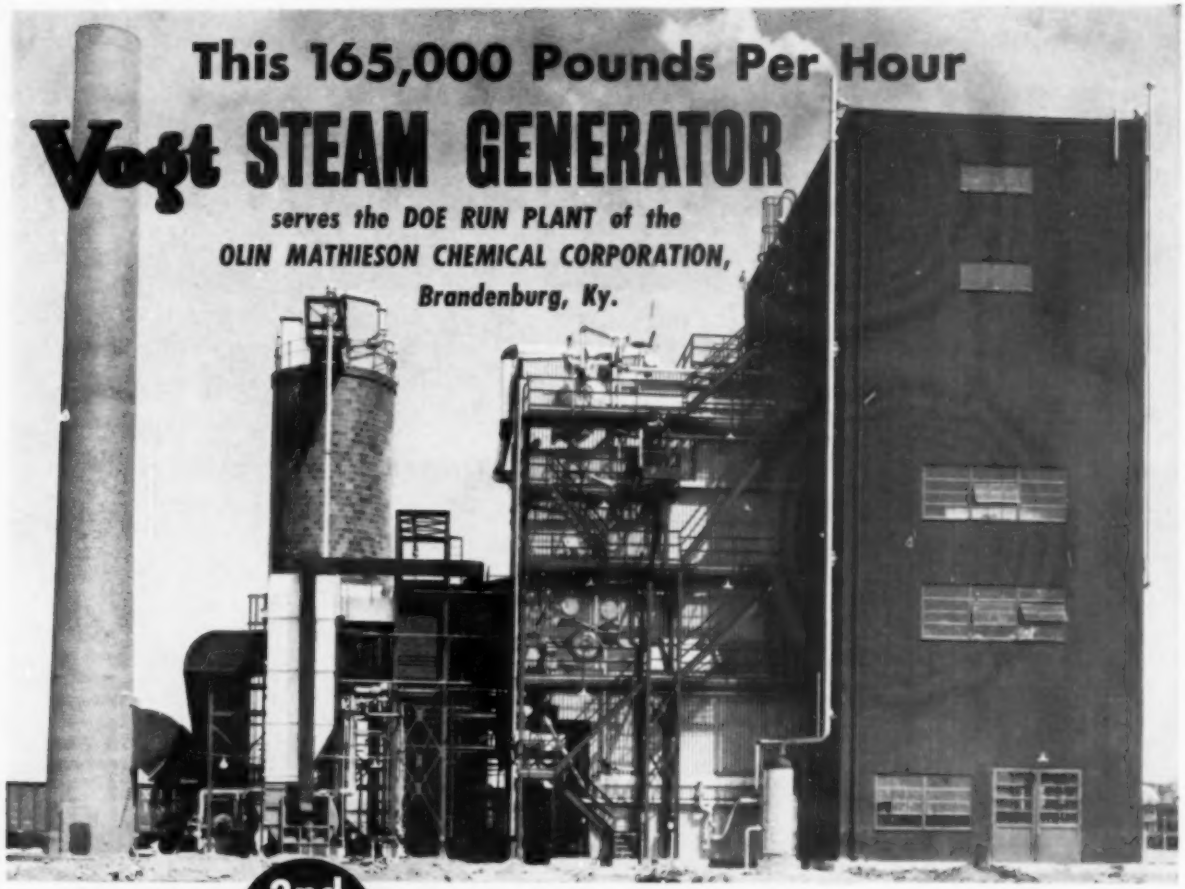
distortion due to temperature swings. Made of steel, they come in sizes from 2" up in all pressure classes.

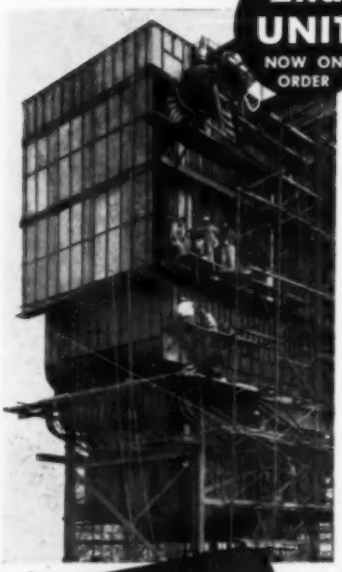
Bi-Valves have the inherent flow efficiency of gate valves and absolute shut-off ability hitherto thought to be exclusive in globe valves. Thus, where globe valves have been preferred in certain applications, it is now possible to use smaller pipes, valves and fittings in many areas. Under special conditions, single Bi-Valves are very successfully being used in place of double valving.

This 165,000 Pounds Per Hour

Vogt STEAM GENERATOR

serves the DOE RUN PLANT of the
OLIN MATHIESON CHEMICAL CORPORATION,
Brandenburg, Ky.





Installed out-in-the-open, the unit generates 165,000 pounds of steam per hour at an operating pressure of 650 psig and 750°F. total temperature when firing pulverized coal or gas in a tangent tube, fully water cooled, pressure tight, steel encased setting.

Outdoor installations, with firing equipment housed, have been promoted by Vogt for many years. They help reduce building and operating costs in leading chemical plants and refineries across the nation.
Contact the Vogt representative nearest you before purchasing new steam generating equipment.

For Custom Installation Bulletin VF-VS-2. Package Unit Bulletin PSG-3 address Dept. 24A-BS

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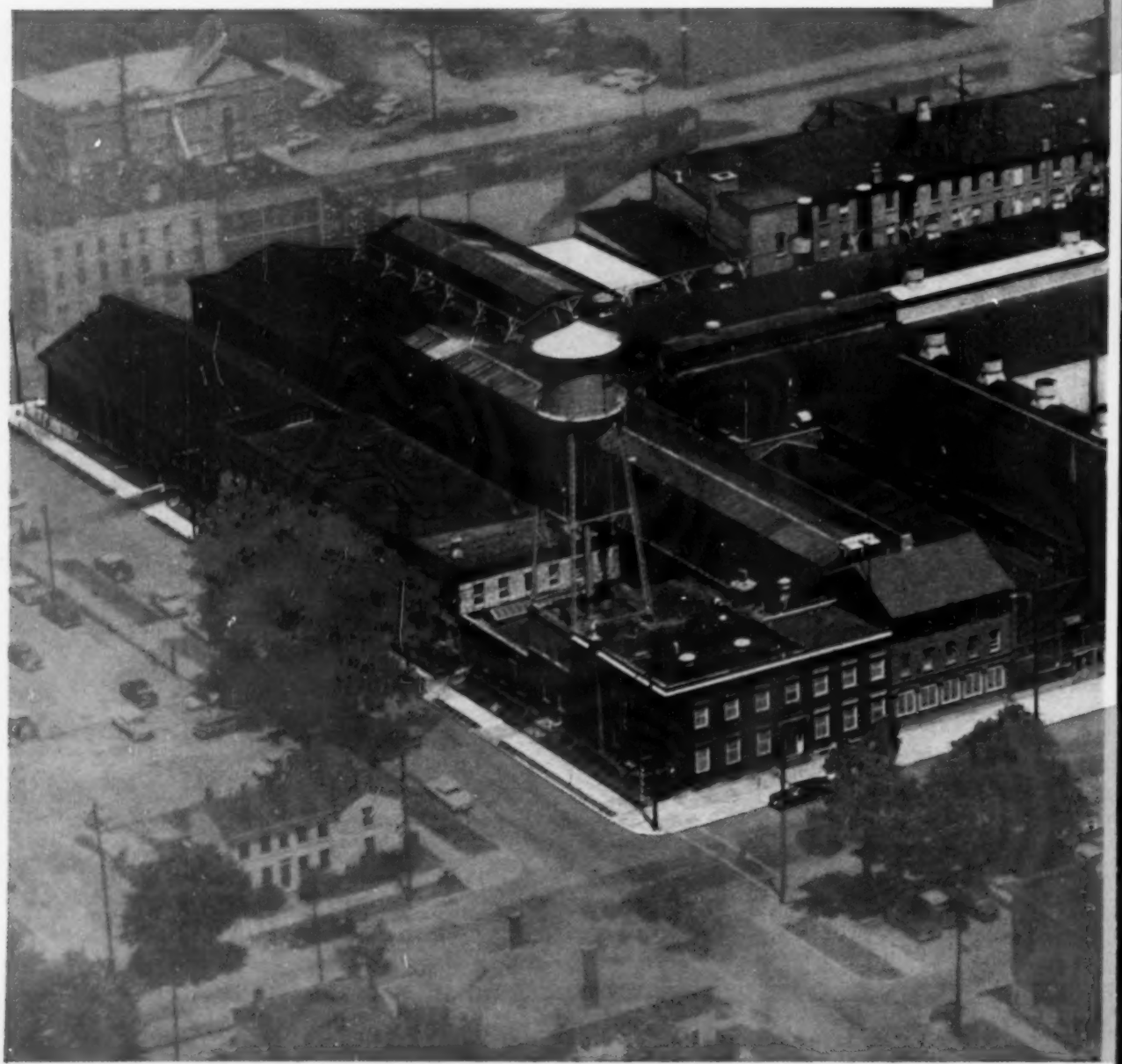
Electrical Protection goes MODERN with BUSS Fuses . . .

at Sandusky Foundry & Machine Co.
Sandusky, Ohio



THIS ALL FUSE INSTALLATION PROVIDES NEEDED HIGH INTERRUPTING CAPACITY—AND SAVED AN ESTIMATED $20,000

A new electrical system was installed at the Sandusky Foundry and Machine Co., to feed a 1000 KVA annealing furnace and plant feeders and sub-feeders.

The engineers at Universal Marine Construction Co., Sandusky, Ohio who designed and installed the job, estimated the available fault current would be in the neighborhood of 75,000 amperes.

To be sure of obtaining the needed safe and dependable protection BUSS Hi-Cap and FUSETRON dual-element fuses were installed.

DEPENDABLE PROTECTION AT A $20,000 SAVING

Including the cost of fuses and switches, an estimated $20,000 was saved over what it would have cost to use mechanically operated devices with an interrupting rating of only 75,000 amperes.

This BUSS and FUSETRON fuse installation also permitted the electrical system to be co-ordinated, so outages on feeder and sub-feeder circuits can be limited to the circuit on which trouble occurs.

ELECTRICAL SYSTEM NOT DISTURBED WHEN TRANSFORMER CAPACITY WAS INCREASED

Shortly after the original installation, additional transformer capacity was added,—bringing the available fault current to approximately 150,000 amperes.

No change in the main service panels was needed, however, as the 200,000 amp. interrupting capacity of BUSS Hi-Cap fuses is still adequate to assure safe protection.

Neither was a change required in the protection of feeder circuits because FUSETRON fuses have adequate interrupting capacity to safely handle any fault that might occur on them.

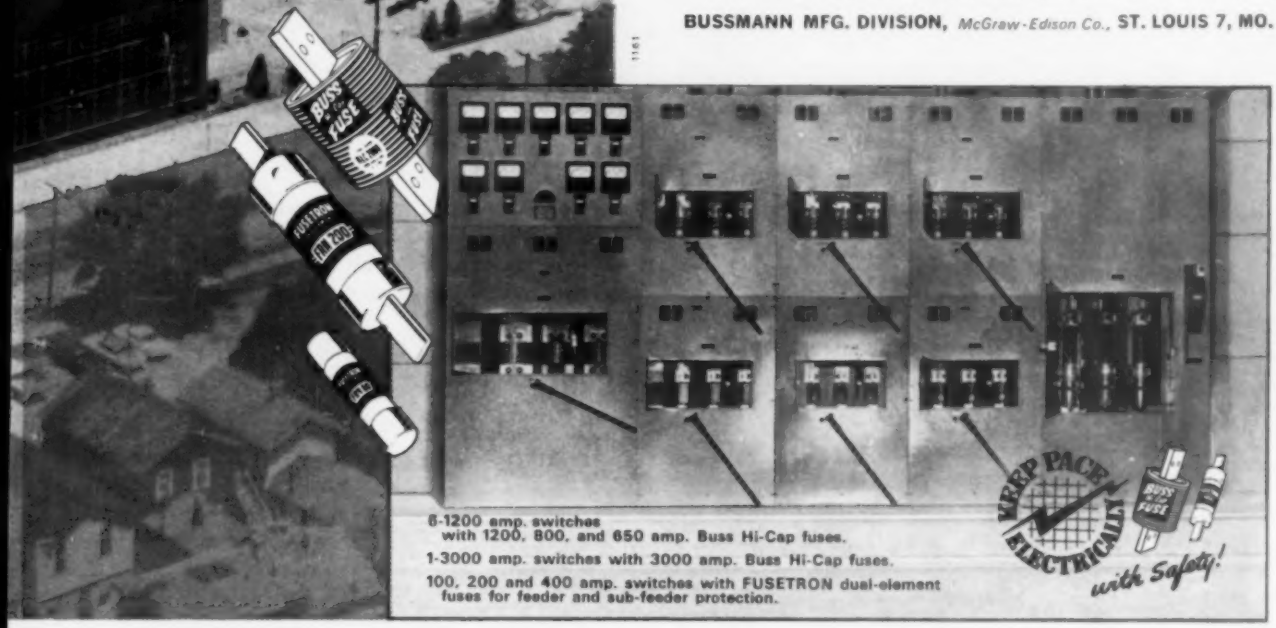
SAFE PROTECTION REMAINS SAFE

After years of inactivity, BUSS Hi-Cap and FUSETRON fuses provide the same safe, accurate protection if called upon to open as they would on the day installed. Dust, fumes, corrosion or age cannot increase the capacity of fuses or lengthen their blowing time.

For more information on how to select the proper fuse, write for the new BUSS booklet . . . *Basic Protection for Electrical Power Systems.*

BUSSMANN MFG. DIVISION, *McGraw-Edison Co.,* **ST. LOUIS 7, MO.**

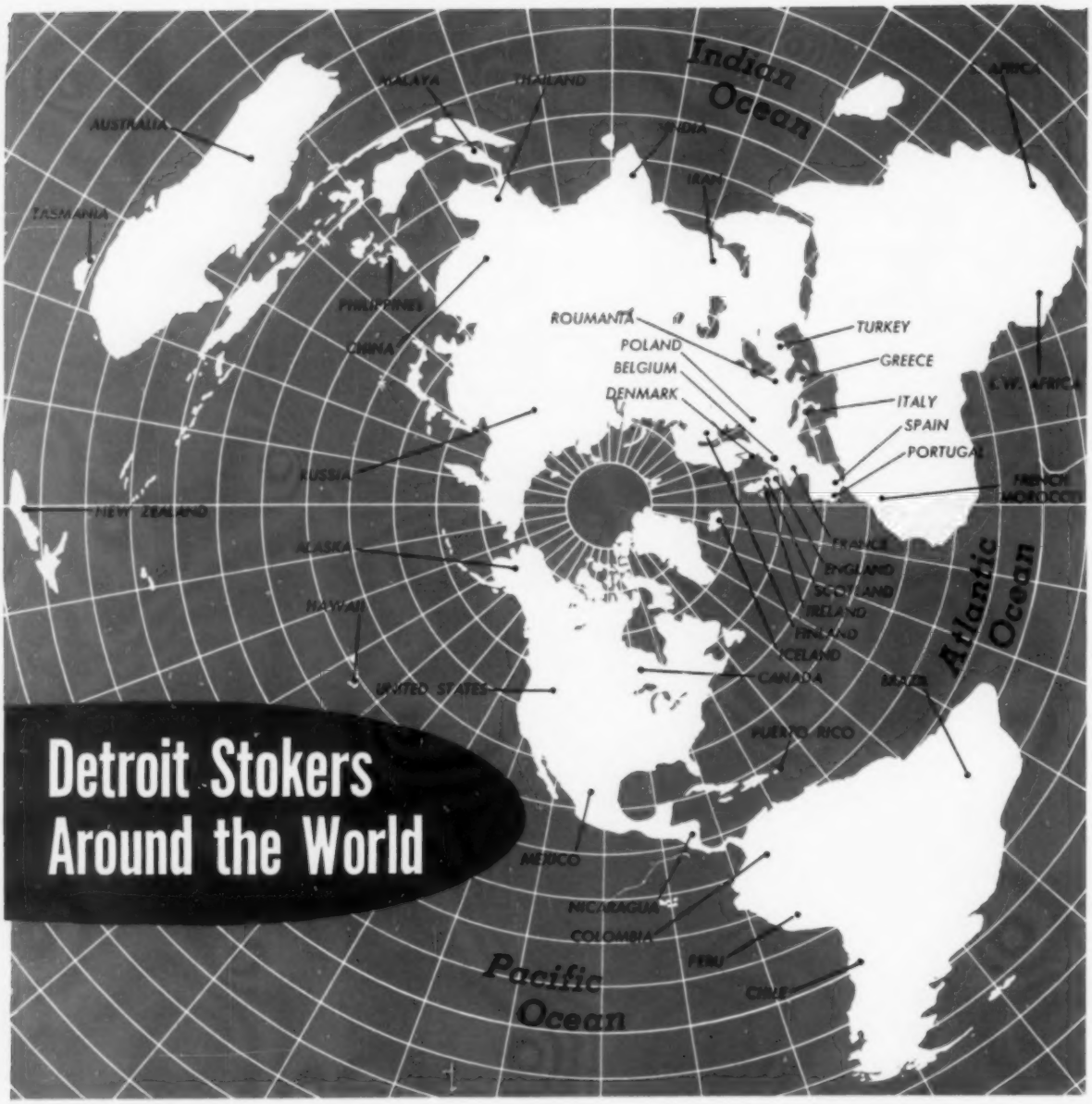
1161



6-1200 amp. switches with 1200, 800, and 650 amp. Buss Hi-Cap fuses.

1-3000 amp. switches with 3000 amp. Buss Hi-Cap fuses.

100, 200 and 400 amp. switches with FUSETRON dual-element fuses for feeder and sub-feeder protection.



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There are Detroit underfeed and overthrow spreader types for boiler capacities from 3,000 to 400,000 pounds of steam per hour and for all grades of bituminous coals, lignite and many by-product waste fuels.

Also special designs for municipal and industrial incinerators.

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NEW Catalogs & Bulletins

. . . there is always a BETTER WAY

MAINTENANCE—TOOLS EQUIPMENT & METHODS

1—Emergency Chemical Cleaning—4 page catalog highlights Anco solvents and service trucks available to remove scale, rust and other deposits from all types of heat exchange equipment. — ANDERSON CHEMICAL COMPANY.

8—Ceramic Coatings — Chempro sprayed ceramic coatings to resist abrasion, erosion and corrosion described in Bulletin CP-28. Ideal for shaft, shaft sleeves, impellers, valves, cams. — CHEMICAL & POWER PRODUCTS, INC.

12—Lubricator Vacuum Type Pumping Unit—If your plant is experiencing difficulty with visibility and excessive maintenance on lubricator sight glasses, the 82 vacuum pumping unit will offer lower cost. Form 1263 gives principle of operation and advantages. — MANZEL.

14—Hose & Fitting Needs—Complete Weatherhead line described in bulletins — flared, flareless, or pipe fittings; brass, stainless, carbon; pressures to 10,000 psi; sizes ⅛" to 2" O.D.; production or small maintenance quantities. — DIESEL INJECTION SALES & SERVICE.

26—TEMPERATURE MEASUREMENTS—Take accurate measurements wherever you go—laboratory, plant or field — with the compact 3½ lb MiniMite null-balance potentiometer pyrometer. Range scales can measure temperatures from minus 450 F to plus 3200 F. Use it for standard checking and calibrating procedures. Automatic cold-junction compensation is built-in.—THERMO ELECTRIC CO., INC.

27—Corrosion Control Systems—Brochure 9111 outlines five-step procedure for primary protection and preventive maintenance of all metal surfaces subject to acids, alkalies, solvents, fumes and gases.—TRUSCON LABORATORIES.

32—Scale Removal — Data sheet on Kwik-Kleen, a completely safe method of rapid scale removal for heat transfer surfaces. — THE NORTH AMERICAN MOGUL PRODUCTS COMPANY.

42—FLOOR REPAIRS — Why halt traffic for repairs? Ready-to-use Magic Floor needs no drying time. Just compress with ordinary lift truck — no tamping or troweling. Traffic can roll immediately. Ideal for expansion joints broken to a V-shape. No skilled labor needed. — RANCO INDUSTRIAL PRODUCTS CORP.

48—WELDING BACKING RINGS—assure quick, easy alignment of pipe or tubing and precise close tolerance fit-up. Allow complete penetration and fusion of the weld. Patented nubs automatically set the welding gap for the root-pass. Internal bevel and flat inner land assures non-restricted fluid flow. For welding pipe, valves and fitting joints.—ROBVON BACKING RING COMPANY.

53—Steam Line Treatment—Folder describes alkaline IPCO S-L-T. Used in boiler water, it will volatilize and travel with steam to return lines. Prevents costly repairs and provides insurance against replacing pipe and fittings. — IPCO, INC.

54—Repair & Maintenance Products—Complete product lines shown in use with prices, sizes, weights, colors and styles. All products distributed by Rasco's 11 Southeastern Branches. — REYNOLDS ALUMINUM SUPPLY CO.

56—Paint & Resin Application — Bulletin A-101-2 describes Turbulator Gun and Bulletin A-101-3 the Formulator A for fast, efficient application of catalyzed epoxy and other coatings — both developed for spraying, pouring or foaming multiple component materials, including many new resins which preclude use of conventional spray equipment. — Plastics and Resin Equipment Div., BINKS MANUFACTURING CO.

67—PNEUMATIC TOOL CLEANER-OILER—Dust and grit enter air tools and with lubricating oil leave resinous deposits which progressively slow down tools and result in excessive wear and expensive repairs.

New Von Arx Cleaner-Oiler cleans and lubricates all kinds of air tools without dismantling them. Service time on average tool is 3 min. using non-flammable solvents and light oils. Cleaning unit is portable.—THE MARINDUS COMPANY, INC.

99—TURBINE & GENERATOR MAINTENANCE — New Southeastern all-inclusive Maintenance Service Contract complements the activities of your regular maintenance department on a scheduled basis.

Consulting Specialist calls at your prescribed intervals — checking equipment, advising plant personnel on operating problems, and submitting recommendation report.

Fuel costs can be minimized, unscheduled outages can be reduced, trained crews cut outage time during overhaul, and planning techniques cut overhaul time by pre-shutdown ordering of necessary parts. — WESTINGHOUSE ELECTRIC — SOUTHEASTERN REGION.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

107—Proportioning Pumps—4 page brochure illustrates and describes proportioning pumps and package chemical feeding units. Includes applications and specifications. —THE BIRD-ARCHER CO.

109—Process Pumping — Factors of best economic balance in process pumping offered by new pipe-mounted centrifugal pumps highlighted in Type SPM Bulletin 142.—PACIFIC PUMPS.

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135—Air Cooled Heat Exchanger — Bulletin 132 describes air-cooled unit to solve the problem of water supply and disposal, cooling fluids or condensing vapors, removing heat at rate of input for close control of temperature. All parts of unit always accessible for easy maintenance with cleanable coils. Replaces both cooling tower and surface condenser. — NIAGARA BLOWER COMPANY.

143—Chemical Feeders—36 page Bul. 1136 describes metering pumps — types, construction, displacement and operating pressures. Gives handling recommendations for chemicals, acids, etc., and volumetric conversion tables. — MANZEL.

154—Chemical Feeders — Bulletin 202, 4 pages, illustrates and describes the Ful-O-Feeder chemical system for continuous heavy duty service. — FULBRIGHT LABORATORIES, INC.

170—Pumping Problems? — Two stage, Type JC pump will meet requirements up to 650 gpm. Horizontally split casing top can be taken off quickly for inspection and rotating parts removed and replaced

Bulletins (Cont.)

without disturbing piping, connections, fittings or driver.—THE WEINMAN PUMP MFG. CO.

INSTRUMENTS—METERS CONTROLS—REGULATORS

207—Control Centers & Systems — Combustion safeguard and automation packaged control centers insure full coordination of complete system, place responsibility on one source, insure correct wiring, and reduce field labor. Catalog C11 illustrates variety of designs and circuits now in use.—WEBSTER ENGINEERING CO.

208—Water Level Alarms—Brochure D1 — Float operated low and high water level alarms and fuel cutoffs, for low and medium pressure boilers, tanks and other vessels. — RELIANCE GAUGE COLUMN CO.

212—Self-Powered Controls—Bulletin 620 describes self-powered automatic temperature regulators — no compressed air or electrical wiring required, no delicate mechanisms to adjust, no packing glands to stick, no shut-down due to power failure. —SARCO COMPANY, INC.

214—REGULATOR HOOK-UPS — New application guides (A5B10) feature application engineering for cost-saving use of air-control pressure regulators. Examples:

How to obtain most efficient steam use for an absorption refrigeration machine with an air-control pressure regulator.

How to provide remote control of a regulator without consuming air, rerouting main piping or adding special air piping.

Guides show you ways to obtain accurate steam pressure control at minimum cost with standard regulators already in service. — SPENCE ENGINEERING CO.

222—Pressure Regulators — Catalog No. 77 illustrates and describes application, operation and specifications for a complete line of reducing, back-pressure and pump-pressure regulators.—MASON-NEILAN.

234—Soot Blowing Control Systems —Bulletin 1029, 16 pages, gives complete engineering description and illustrations of Selective-Sequence and Automatic-Sequential insert type panel controllers. List of typical installations shows wide variety of applications. — COPES-VULCAN DIVISION.

287—Color-Port Water Gage — Bulletin WG-1814 describes the new gage for high pressure boilers (up to 3300 psi). Gives full details on design and operation and shows how it gives greater visibility and greatly reduced maintenance requirements. —YARNALL-WARING COMPANY.

293—PLANT AUTOMATION — Three step approach and step by step commitment in new "parallel programming" 700 System.

Simplify information now presented by multi-record charts, gages and lights. . . . Verify practicability of automation by extending supervisory controls and letting equipment perform more operating functions . . . then Automate with proved operational experience.

Approach improves plant availability by making it practical to remove individual systems from service or reprogram without disturbing operation.—BAILEY METER COMPANY.

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PLANT CONSTRUCTION—WELDING EQUIPMENT—SPECIALTIES

305—Compressed Air Dryers — Stop freezing of air lines inside and outside the plant; extract moisture and foreign particles; protect pneumatic equipment against corrosion and operate for less than 1-cent per 18,000 cu ft. 16-page brochure with charts gives details. — VAN PRODUCTS CO.

306—Steel Buildings — Shed roof, gable roof frameless and gable roof rigid frame units described in Catalog SX-13757. 5,000 sizes available to meet all space needs. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

311—INFRA-RED HEATING—Overhead gas fired Panelbloc can do almost any kind of industrial heating job. Needs no electrical connections, has no fans, motors or blowers. AGA, Underwriters and CGA approved. Bulletin PC-159SP gives details. — PANELBLOC DIVISION, Bettcher Mfg.

316—Drainage & Construction — Catalog Gen-10658 gives data on products for industrial uses, including corrugated metal pipe, paved-invert pipe. Asbestos-Bonded pipe, Multi-Plate pipe, pipe arches, perforated pipe, and water control gates. —ARMCO DRAINAGE & METAL PRODUCTS, INC.

327—Steam Fan Heater — Bulletin 109 discusses heater design which makes full use of all latent and sensible heat in steam up to 200 lb without requiring expensive piping and pressure reducing stations. Applicable to large plant heating or process.—NIAGARA BLOWER CO.

342—Power Roof Ventilators — Bulletin 550 describes V-belt driven centrifugal type power roof ventilators. Pressures to 2" SP; capacities from 1500 to 26,500 cfm.—CLARAGE FAN CO.

386—Rigid Frame Buildings—8 page bulletin "Dixisteel Rigid Frame Buildings" — low cost, flexibility of design, durability, and minimum maintenance; also triangular or bow-string truss all-steel roof systems; fabricated for rapid erection. — ATLANTIC STEEL COMPANY.

391—LOW-COST HEATING — As completely self-contained heating system or in conjunction with existing heating and air conditioning (same ducts can be used) new Thermo Directaire Heater offers flexibility at minimum cost. Directaire booklet 30X gives details for many types of space heating or for manufacturing processes under strict thermostatic control.—TODD PRODUCTS, a Div. of Todd Shipyards.

PIPING—VALVES—FITTINGS STEAM SPECIALTIES—TRAPS

403—Valve Operators—Folder shows how re-designed spricket rim makes any valve readily accessible from the floor. Simplifies pipe layouts, prevents accidents, fits all valve wheels. — BABBITT STEAM SPECIALTY CO.

409—Lubricated Plug Valves—Catalog PV-4 covers operational features. Quarter-turn to open or close; lubricant grooves provide positive seal when valve is closed; when open, seating surfaces not exposed. —THE WM. POWELL COMPANY.

415—Steam Trap—Bulletin No. 455-B describes the Float-Thermostatic steam trap with its entire operating element in one unit making it removable without disturbing inlet and outlet connection to the semi-steel trap body, suitable for 125 psi steam pressure.—SARCO COMPANY, INC.

416—Control Valves—Illustrated Cat. 305 contains detailed specifications on air-operated control valves. All usual types are described. Technical data are included as an aid to selection.—MASON-NEILAN DIV.

452—Pipe and Tubes — 42 page Bulletin 26 gives types of steel tubes, tensile, creep and rupture properties, welding and forming data, applications and other valuable information. — National Tube Div., UNITED STATES STEEL CORP.

463—Stainless Steel Valves — Catalog 59 SS describes gate, globe and swing check valves with valve patterns in alloys that satisfy requirements of most corrosive services. Includes section on resistance of alloys to many corrosive media under varying conditions. — JENKINS BROS.

468—Steam Traps — 40 page engineering manual aids engineers and maintenance men in sizing, specifying and buying of steam traps and other fluid specialties. All data necessary to engineer a trap installation is included. — V. D. ANDERSON CO.

478—Trap Selection—Booklet "How to Select Steam Traps and Other Fluid Specialties" gives valuable tips

on which of the four basic types of traps — inverted bucket, thermostatic, combination or float — to use for any installation.—V. D. ANDERSON CO.

487—Power & Process Piping—Offering single responsibility, specialized service, integrated facilities for all piping, Catalog 60B highlights erection, fabrication and welding fittings details. Case studies from the South-Southwest.—MIDWEST PIPING COMPANY.

493—Unions & Swing Check Valves —Engineering data, sizes, weights and dimensions on Perfect Seal Pipe Unions and Swing Check Valves featured in 20-p Cat. 60. Also includes Gasketless Cup - Orifice Unions and Ductile Iron Check Valves.—CATAWISSA VALVE & FITTINGS CO.

495—ALL-PURPOSE CONTROL VALVE—Combining diaphragm valve versatility, ball type flow capacity and packless gate valve simplicity, the new all-purpose Dia-Plug Valve offers positive control for gases, slurries, liquids and vacuum. Design features and flow characteristics in Bulletins 100 and 101. ⅜" through 8" from stock; larger sizes on special order. — CRYOGENICS CORPORATION.

BOILERS—STOKERS BURNERS—FUELS

501—Packaged Steam Generators — DK units described in bulletin: 24 sizes for gas, oil or combination firing in capacities up to 60,000 lb/hr, with design pressures up to 600 psi. Special package boilers up to 100,000 lb/hr and field erected units up to 200,000 lb/hr for all fuels and all types of firing are featured. — E. KEELER COMPANY.

502—Feedwater Treatment—4 page catalog tells how Braxon and Flako internally condition water to remove and prevent scale formation and corrosion in boilers.—ANDERSON CHEMICAL COMPANY.

513—Compact Economy Boiler — Side-fired units give 20% more usable floor space than end - fired units of same capacity. Largest model of line only 134" x 76" — gas or oil fired 6 to 50 hp; 100 to 125 lb pressure; 201,000 to 1,673,950 Btu/hr capacity. Wired, assembled and tested at factory. Catalog 140 gives details. — LOOKOUT BOILER & MANUFACTURING.

517—Generating Steam? — Get this complete story on boiler operation, maintenance and equipment with suggestions on preventive control. Prevent costly shut - down caused by mineral deposits and corrosion. — FULBRIGHT LABORATORIES.

528—HOW TO SELECT A BOILER — Booklet highlights engineering excellence — single tip burner nozzle, rotary air damper, air nozzle purge and other features contributing to greater efficiency in burning of fuel.—CLEAVER-BROOKS.

529—Boiler-Burner Lease Plans — New rental plan for Powermaster boilers and burner systems covers use of equipment and cost of installation without capital investment. — ORR & SEMBOWER, INC.

536—Automatic Boiler - Burner Unit —Assembled plant (Scotch-type, two-pass) for all heat or power applications, low pressure or high pressure; burner to match for heavy oil, light oil, or combinations of gas/light or gas/heavy oil. Easy maintenance. Bulletin SPI-100 gives details.—INDUSTRIAL COMBUSTION, INC.

543—BARK & COAL FIRED BOILER CONTROL—Fully-automatic combustion control at Hammermill Paper described in 12 page Bulletin 1078. System performance under unusual firing conditions is described. —COPES-VULCAN DIVISION.

551—Packaged Water Tube Boilers —Complete data and dimensions for boilers ranging from 8,000 to 50,000 lb/hr, firing oil or gas or both, described in 12 page Catalog 111 - D.—SUPERIOR COMBUSTION INDUSTRIES, INC.

558—Boiler Auxiliary Package Units — Packaged system of various compact combinations of deaerating feedwater heaters, boiler feed pumps, condensate surge tanks and blow-off tanks described in Bulletin 59 - 1. Standard units for steam plants of 10,000 to 100,000 lb/hr capacity and pressure to 300 psig. Higher capacity units also available. — WICKES BOILER CO.

563—Burn Refuse Fuels — Bulletin 510 describes and illustrates spreader stokers for utilizing many refuse and by-product waste materails as fuel to produce steam for process, power or heating. — DETROIT STOKER COMPANY.

570—Seamless Boiler Tubes — 44 page Bulletin 12 contains complete description of manufacture, advantages, tolerances, allowable

(Continued on page 74)

ELECTRICAL MAINTENANCE . . .

New Tools . . Equipment . . and Methods for the Engineering-Operating-Maintenance Team

803—Power Control — Bulletin describes design, manufacturing and consulting services for motor control centers; switchgear; power centers; specialty, mechanical and automation control requirements.—POWER CONTROL COMPANY.

804—Conductor Identification—New phase identification set (Bulletin 82SP) saves labor costs on phase determination and conductor identification on underground systems without need for removing all safety grounds. Transmitter operates from either 60 cycle supply or self-contained dry cells. — JAMES G. BIDDLE CO.

813—600-Volt Wiring—How Anaconda Densheath 900 offers long life, high heat and moisture resistance, chemical stability and easy installation is described in Bulletin DM - 5612. — ANCONDA WIRE & CABLE CO.

816—High Voltage Protection — 36 page catalog of linemen's protective equipment describes products for utility and industrial electrical fields. — CHARLESTON RUBBER COMPANY.

830—Diagnose Electrical "Ills"—Determine current loads of power equipment . . . identify unmarked motor terminals . . . test for low-voltage conditions . . . check resistance in solenoid coils with the $52.50 Amprobe RS - 3. — AMPROBE INSTRUMENT CORPORATION.

834—INSULATED WIRE — 6 to 56 pairs of matched conductors in one cable . . . plastics, fibers, metallic sheaths and armor insulations . . . long life and accuracy (through heat, moisture, mechanical abuse and contaminants) in temperature measuring systems. Ceramo metal sheathed-ceramic insulated wire and Thermo-Cable described in Catalog 135. — THERMO ELECTRIC.

861—ELECTRICAL PROTECTION — For modern all - purpose protection of circuits up to 600 amp, Fusetron fuses have 100,000 amp interrupting capacity and sufficient time-lag to hold harmless overloads. Bulletin FIS covers dual - element fuses; Bulletin HCS Hi-Cap fuses.—BUSSMANN MFG. DIVISION.

874—High Voltage Rubber Cables—32 page catalog contains information on design features, insulations available, and performance highlights of company's butyl rubber power cable, Durasheath. Also data on kinds of available constructions from 600 v to 15,000 v conductors. — ANACONDA WIRE & CABLE CO.

877—Motor & Commutator Maintenance — Line of resurfacers, flexible abrasives, grinders, brush seaters, undercutters and other tools described in Motor Maintenance Products catalog. — IDEAL INDUSTRIES, INC.

885—Electrical Maintenance — File 21 tells how to set up good electrical testing program — insulation resistance testing, motor and phase testing, cable fault location. — JAMES G. BIDDLE CO.

For More Free Data FILL IN CODE NO. on the Handy Return Card — Page 69

Bulletins (Cont.)

stress and working pressures, bursting strength, weights, steam properties and other data. — NATIONAL TUBE DIV., UNITED STATES STEEL CORP.

577—Combustion Control — 12 page Bulletin 510 illustrates and describes how company's combustion control systems are applied to four major makes of pulverized coal-fired boilers.—BAILEY METER CO.

587—Coal - Fired Packaged Boiler — The new semi-automatic stoker-fired unit available in standard sizes of 43,000, 50,000 and 63,000 lb/hr, described in Bulletin PG - 59 - 4. Performance characteristics, line drawings, and photos included.—FOSTER WHEELER CORPORATION.

POWER TRANSMISSION MATERIAL HANDLING

606—Retaining Ring Kits—400 Truarc cadmium plated rings — 84 sizes in one economy kit. Sizes from ¼ to 2½ in. in three most used series of internal, external and universal crescent ring designs—$34.50 per kit.—DIXIE BEARINGS, INC.

608—Side-Loading Trucks—One unit can easily load, stack and transport long, bulky selective loads. Traveloader maneuvers in aisles only 6½ ft wide; electric and gas powered units; low maintenance features. — BAKER INDUSTRIAL TRUCKS.

625—Job-Mated Hoists — Capacities from ¼ to 30 tons; motor-driven or push-type trolleys; single or multiple speed controls pushbutton, pendant rope, or lever controllers; floor or cab operation; vapor - proof or explosion - proof construction. — SHEPARD NILES CRANE AND HOIST CORP.

For More Free Data FILL IN CODE NO. on the Handy Return Card — Page 69

626—Bearings — Brochure details complete bearing and specialty lines available through 18 Southeastern Service Centers. Plant surveys, inventory control, application engineering also part of service to customers of replacement bearings. — DIXIE BEARINGS, INC.

641—Belt Conveyors—Cat. ID-591, 88 pages, shows principal belt conveyor products, including heavy duty and standard roller bearing and precision ball bearing idlers. Engineering data for proper selection. — CONTINENTAL CONVEYOR & EQUIPMENT CO.

644—Elevator Maintenance — How Otis contract maintenance service keeps equipment operating like new outlined in 24-page catalog. Preventive maintenance corrects one fault before one fault can cause another. — OTIS ELEVATOR COMPANY.

WATER TREATMENT—HEATING & AIR CONDITIONING—DUST & FUME CONTROL—REFRIGERATION

704—Water Conditioning—Brochure describes company's engineering services — zeolite water softeners, filters and purifiers, aerators and degasitors and process and boiler water conditioning, rebuilding and modernizing service.—SOUTHERN WATER CONDITIONING, INC.

706—Centrifugal Blowers & Exhausters—Catalog ACB - 104 covers units providing uniform air pressure up to 10 psi, or vacuum up to 12-in. of mercury. Volumes to 20,000 cfm. Line provides clean, dry air or gas at constant pressure for many processes. — Air Appliance Div., HOFFMAN INDUSTRIES.

709—Purer Process Water — Data tells how Ferri-Floc (ferric sulfate) can help with coagulation and softening, removal of iron and manganese and other water purification problems. — TENNESSEE CORPORATION.

711—Refrigeration Condensers—Bulletin RC-2 shows how Vogt condensers step up rate of heat transfer and step down head pressures. Closed type for clean water; film type where water is hard and forms scale. Units save power and refrigeration cost. — HENRY VOGT MACHINE COMPANY.

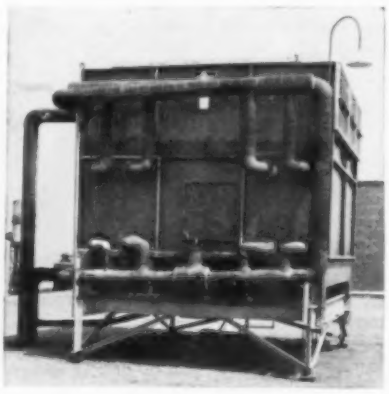
712—Ion Exchange — Bulletins discuss Two - Bed De - Ionizers and Mixed-Bed De-Ionizers, with photos to illustrate plant applications and diagrams to show operation.—ILLINOIS WATER TREATMENT COMPANY.

716—Dust Collection—Whether nuisance elimination or process material recovery, check on Whirlex Dust Collector Units. Engineering data available. — THE FLY ASH ARRESTOR CORP.

717—AIR HANDLERS—For heating, ventilating and cooling applications available in 37 different horizontal, vertical and multi-zone type units, 14 sizes, capacities to 44,000 cfm. Feature installation flexibility. Only external, sealed self-aligning Sealtite ball bearings with Alemite fittings are used to simplify service and maintenance.—ACME INDUSTRIES, INC.

741—CAST ALUMINUM CENTRIFUGAL BLOWERS—New Model 377 single and multi-stage air blowers and gas boosters of overhung design have both cast aluminum impellers and housings. "Industrial" designs intended for low pressure air or gas service — up to 20 ounces or so — with volumes to approx. 120 cfm. — Air Appliance Division, HOFFMAN INDUSTRIES, INC.

The Most Reliable, Long-Lived Cooling Equipment



● Every day this Niagara AIR-COOLED Heat Exchanger is adding $90 revenue while its owner's plant is in operation, from savings in the cost of cooling water.

For more than thirty years similar machines have been making such savings in industries all over the country. They do not wear out, are easy to keep clean and cost little for upkeep. Panel construction makes all parts accessible. Cleanable coils are available.

With the Niagara Aero® Heat Exchanger you have a closed system of cooling, free from dirt. Heat is removed at the rate of input, making it easy to control temperatures. The heat is dispersed into the atmosphere by means of evaporation of a very small amount of water, solving the problems of cooling water supply and disposal.

Write for bulletins 120 and 132.

NIAGARA BLOWER COMPANY

Dept. SP-12, 405 Lexington Ave., New York 17, N. Y.

Niagara District Engineers in Principal Cities of U.S. and Canada

742—Water Treating Equipment Guide — Bulletin 615 illustrates and describes the newest in manual and automatic zeolite water softeners, demineralizers and deionizers, dealkalizers, etc. Spray and tray type deaerating heaters and water treating chemicals also included. — ELGIN SOFTENER CORP.

752—Automatic Water Control — 4 page bulletin describes Chemtrol control for treatment of cooling tower water. Adaptable to any size unit, in any location, and to any type water, it controls pH, prevents scale, controls corrosion and eliminates algae — all simultaneously, completely automatically and economically.—WATER SERVICES INC.

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See pages 69 & 70

753—ALGAE & FUNGUS INHIBITOR—Non-corrosive mixture of chlorinated phenolic compounds for use in cooling towers, air conditioning systems, ammonia condensers and water spray ponds is completely compatible with water treatment chemicals. Formula D-130 is concentrate added to system at different feed rates. — THE BIRD - ARCHER COMPANY.

757—Boiler Water Treatment — Data sheets P-101 through P-107 summarize products and their application. — FULBRIGHT LABORATORIES, INC.

763—PROFIT IN 'SHAVE - OFF' — Cyclone units harness the double-eddy — 'Shave-Off' recirculating dust particles trapped in upper eddy and channel them down to main body of dust well below clean gas outlet. Catalog 103 gives details on great recovery of valuable dust, elimination of air pollution and longer cyclone life. — BUELL ENGINEERING CO., INC.

777—INTRO TO BOILER FEEDWATER TREATMENT — How pure must feedwater be? . . . How does operating pressure influence boiler water composition? . . . What's meant by 'external' and 'internal' feedwater treatment? . . . and many more in new 24-page Bulletin 30. — NALCO CHEMICAL COMPANY.

780—Cooling Water Control — Bulletin describes the Chemicator . . . for automatic control of scale, corrosion and slime in cooling towers and evaporative condensers. Trouble-free design with no moving parts. — IPCO LABORATORIES, INC.

In power installations . . . where the slightest malfunction can mean power failure . . . you find Weinman Pumps the standard for quality, efficiency and dependability of performance. Demand is rigid and constant and Weinman Pumps have proved themselves on the job by instant response and smooth 'round-the-clock operation . . . day after day.

Weinman Type JC Multi-Stage, Split-Case Pumps are especially effective for power plant operation. Designed primarily for direct connection to motors and steam turbines, they can handle a wide range of industrial applications with speed and efficiency.

And, their horizontally split case makes them a favorite of management and maintenance men alike because inspection and routine upkeep of rotating parts is quick and easy without tearing down the entire pump. This results in important cost savings because maintenance and downtime are cut to a minimum.

There's a Weinman Pump to solve *your* pumping problem . . . economically. Just consult your Weinman Pump Specialist for the advice of experience. He's in the Yellow Pages.

For complete information and literature on all Weinman Pumps, write:

THE **WEINMAN PUMP** MFG. CO.
290 SPRUCE STREET COLUMBUS 15, OHIO
CENTRIFUGAL SPECIALISTS

BETTER JOBS at LOWER COST with

AIRETOOL

PNEUMATIC TOOLS

SCREWDRIVERS

straight or pistol-type; reversing or non-reversing mechanism; choice of direct drive, adjustable or positive clutch.

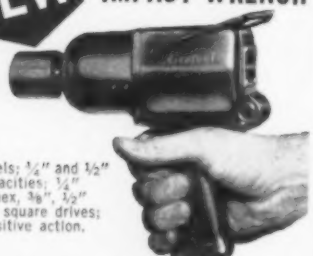
NUTSETTERS

straight or pistol-type; reversing or non-reversing mechanism; choice of direct drive, adjustable or positive clutch.

Screwdriver-Nutsetter Combination

automatic, push-start; fast, convenient interchange of screwdriver bits and nutsetter attachments; adjustable or positive clutch.

NEW AIRETOOL IMPACT WRENCH



Six models; ¼" and ½" bolt capacities; ¼" female hex, ⅜", ½" and ⅝" square drives; fast, positive action.

Test easy-to-use AIRETOOL in your own operations . . . see the difference. Call your Airetool representative . . . or write us direct.

Representatives in principal cities of the free world.

Bulletins (Cont.)

Late Bulletins

Z-101—Small Unit Heaters — Catalog, 20 pages, provides physical dimensions, steam and hot water ratings, electrical and piping diagrams for unit heaters ranging from 13,400 Btu to 1,062,000 Btu. — CARRIER AIR CONDITIONING COMPANY, Syracuse, N. Y.

Z-102—Steam Turbines — Booklet B-8227, 24 pages, presents "Multivalve Steam Turbines for Process Industries," with cutaway drawings and descriptions of the various types of M-line high-speed mechanical drive steam turbines. — WESTINGHOUSE ELECTRIC CORPORATION, P. O. Box 2099, Pittsburgh 30, Pa.

Z-103—Fuel Oil Heaters — Bulletin No. 1416, 12 pages, gives sizes, dimensions, capacities, and other information on G-R Twin G-Fin and "Style B" fuel oil heaters. — THE GRISCOM-RUSSELL CO., 185 Wetmore Ave., S.E., Massilon, Ohio.

Z-104—Liquid Level Switches — Brochure SF-765, 12 pages, describes "LevelAc" control line employing stationary ceramic magnets, completely surrounding a sealing tube inside which a magnetic shunt moves in response to liquid level fluctuations. — FULTON SYLPHON DIVISION, Robertshaw-Fulton Controls Co., P. O. Box 400, Knoxville 1, Tenn.

Z-105—Manual Remote Controls — Bulletin 618, 20 pages, covers manual remote controls for valves used in power plants, chemical plants, and other industries. Includes dimensional sketches of all terminals. — STOW MFG. CO., 443 State St., Binghamton, N. Y.

Z-106—Chemical Machinery—Bulletin 113, 4 pages, features motors and drives used in the chemical processing industries. Photographs show gearmotors, adjustable speed drives, and explosion-proof, nonventilated, drip-proof and wound rotor motors. — LOUIS ALLIS COMPANY, Dept. P, 427 E. Stewart, Milwaukee, Wisc.

Z-107—Air Control Regulators — Guide Sheets A5B10 include diagrams, recommended installation and steam capacity tables for efficient use of air control pressure regulators. — SPENCE ENGINEERING CO., INC., Walden 2, N. Y.

Z-108—Ball Valves — Catalog No. 1200-A provides detailed information on complete line of manually operated and pneumatically operated ball valves, ranging in size from ¼" through 12". — HILLS-McCANNA COMPANY, 400 Maple Ave., Carpentersville, Ill.

Z-109—Positive Flow Boiler — Bulletin No. 1275 describes new Powermaster Positive Flow packaged automatic boiler, which incorporates side located furnace, a new burner design, quiet operation, and other features. — ORR & SEMBOWER, INC., Reading, Pa.

Z-110—Furnace Explosions — Bulletin E-101, 16 pages, analyzes causes of 156 recent explosions and presents recommendations for safe operation of furnaces. — THE BABCOCK & WILCOX COMPANY, 161 East 42nd St., New York 17, N. Y.

Z-111—Air Handling — Engineering Reference Guides, 5 x 7 cards, cover subjects: Basic Fan Laws; Velocities Required for Conveying Materials; Air Velocities Required for Exhaust Hoods; and Units of Measurement for Fan Selection. — CHICAGO BLOWER CORPORATION, Franklin Park, Ill.

Z-112—View Gauges — Catalog features 168 liquid-level gauges for gear cases, machine tools, oil reservoirs, hydraulic systems, pulps, filling machines, tanks and bins. — GITS BROS. MFG. CO., 1866 S. Kilbourn Ave., Chicago 23, Ill.

Z-113—Swing Check Valves — Bulletin No. 6102, 24 pages, tells how the revolving double disc principle has been adapted to swing check valves. Includes pressure table and construction details. — DARLING VALVE & MANUFACTURING COMPANY, Williamsport, Pa.

Z-114—Proportioning Pumps — Bulletin 861, 12 pages, covers line of proportioning pumps, with capacity and selection tables, and explanation of hypocycloidal arrangement of gears. — JAECO PUMP COMPANY, Villanova, Pa.

New ASME Publications

Three new Supplements on Instruments and Apparatus to the Power Test Code, published by **The American Society of Mechanical Engineers**, are now available for purchase.

"Temperature Measurement" (Part 3 of the series), replaces a segment of the test codes originally published during the period 1931-1945. Pamphlet copies of the supplement are available from the ASME Order Department at $5.50 per copy.

"Measurement of Shaft Horsepower" (Part 7) is a new addition to the series. It reflects a need, first formulated some four years ago, for a description of various types of instruments and methods of measurement likely to be prescribed in any of the ASME Power Test Codes. Copies are available at $2.50 per copy from the ASME Order Department.

The third new publication, "Measurements of Rotary Speed" (Part 13), is a revision of an earlier addition last revised in 1939. Copies are available at $2.00 each from the ASME Order Department, 345 East 47th St., New York 17, N. Y.

Southern News Briefs

(*Continued from page* 22)

Alco Products—S.E.

Alco Products, Inc. has announced the appointment of the Bishop Sales Engineering Co. of Atlanta as its southeastern agent for the sale of feedwater heaters,

evaporators and other heat transfer equipment. The territory includes Georgia, Florida, Alabama, North and South Carolina and parts of Tennessee and Mississippi.

The Bishop Company, under the leadership of William V. Bishop, is located at 3544 Ivy Road, N.E., Atlanta 5, Georgia. The firm specializes in mechanical equipment for central station power plants and for industry.

Mr. Bishop received his mechanical engineering degree from Auburn University and has had 14 years' experience in sales engineering.

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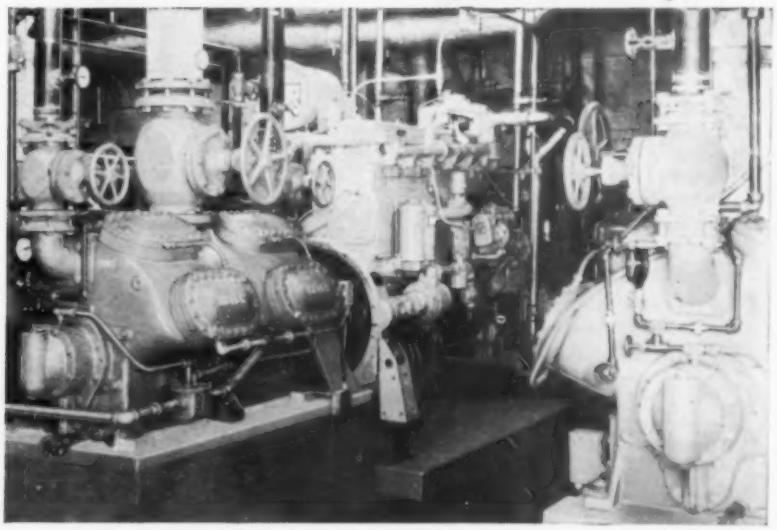
See pages 69 & 70

Mobilift—St. Louis

Morris Equipment Company, 4217 Meramec, St. Louis, Missouri, has been awarded a franchise as an authorized dealer for the Mobilift Materials Handling Equipment Division of **Motec Industries, Inc.**

Morris Equipment Company will furnish Mobilift sales and service to a territory which includes St. Louis and several counties in Missouri and Illinois.

Various Steps...
VARIABLE CAPACITY



WILSON & CO. INC.

View showing the two 16-cylinder Vilter ammonia compressors, driven by Caterpillar natural gas engines, in Wilson & Co.'s Albert Lea, Minnesota, plant. These two new Vilter Units supply an additional 200 tons of refrigeration to the plant's existing 1800 tons.

The new Vilter Close Capacity Control System*, offering two or more steps of control, depending upon the number and size of compressors, may well be the answer to your particular refrigeration problem.

For example, at Wilson & Co.'s packing plant in Albert Lea, Minnesota, two new Vilter 16-cylinder natural gas engine-driven compressors have a six-step Vilter Close Capacity Control System actuated by saturated suction temperatures. The compressors are controlled with the first and second steps modulating the engine speed of each between 1200 and 900 RPM in sequence. When capacity reduction is required below this point, the compressors are unloaded in four equal stages down to 50% capacity on Compressor No. 2. A sequence changer is provided to distribute compressor wear, as well as to offer a recycling feature.

Some of the characteristics of the Vilter Close Capacity Control System are: accurate, close control over the entire range (especially valuable for low pressures); up to 20 capacity steps; convenience of control by a single adjustment of the thermostat; adjustable control to prevent loading and unloading due to rapid load changes; recycling and sequence changing features.

Wilson has had a long and most satisfactory acquaintance with Vilter equipment. At Albert Lea, Vilter equipment includes: horizontal, vertical and rotary compressors; Pakicers; a blast freezer; Zer-O-Disc fin coils; and many others. Acceptance of Vilter is based on product reliability and competent service.

It will pay you to investigate thoroughly Vilter's complete line of refrigeration equipment and the flexible control systems available for your application.

**Patent Pending*

Vilter® refrigeration air conditioning

Vilter Manufacturing Corporation
Milwaukee 7, Wisconsin

Air Units • Ammonia and Freon Compressors • Two-Stage and Booster Compressors • Water and Brine Coolers • Blast Freezers Evaporative and Shell and Tube Condensers • Pipe Coils Valves and Fittings • Pakice and Polarflake Ice Machines Liquid Transfer Systems Air Agitated Ice Builders

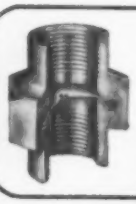
Write for helpful bulletins to Vilter Manufacturing Corporation Dept. SP61-3 2217 South First Street Milwaukee 7, Wisconsin

Catawissa
PERFECT SEAL
Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

A TYPE FOR EVERY USE!
FOR ALL PRESSURES!
FOR ALL TEMPERATURES!

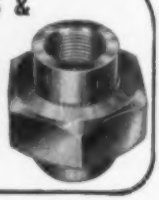
Standard & Double Extra Heavy
UNIONS
Available with screwed or socket weld ends. 3000-lb. sizes ⅛" to 3"; 6000-lb. sizes ⅛" to 2".



GASKETLESS
CUP-ORIFICE
UNIONS
Choice of stainless or carbon steel cup-type plate. 3000-lb. service.

MALE & FEMALE
UNIONS
With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.

FULL STAINLESS &
FULL ALLOY
STEEL UNIONS
With screwed or socket weld ends. 3000-lb. and 8000-lb. service.



WRITE FOR CATALOG 60
showing the complete Catawissa line of Perfect Seal Products

CATAWISSA VALVE & FITTINGS COMPANY
CATAWISSA, PENNA.

Southern News Briefs (Continued)

Vogt — New Orleans

James S. Flower is manager of the recently established New Orleans district office of **Henry Vogt Machine Co.** of Louisville, Kentucky.

The new office, located at 631 N.B.C. Building, New Orleans, Louisiana, will handle all of the company's products including forged steel valves, fittings, flanges and unions.

Pennsalt—Atlanta

Howard M. Brittain has been assigned to **Pennsalt Chemicals Corporation's** Atlanta Regional Office as a Technical Service Representative, according to George D. Grogan, general sales manager of the Industrial Chemicals Division. Mr. Brittain will be responsible for assisting textile finishing companies in the Southeast. These firms use hydrogen peroxide, chlorine and caustic soda manufactured by Pennsalt in their operations. He will operate from Pennsalt's Atlanta sales office located on College Park Road, Hapeville.

B&W & Youngstown Produce New Piping

A complete "package" of corrosion-resistant piping materials is being made available as the result of a license recently awarded **The Babcock & Wilcox Company** to produce and sell welding fittings and flanges of Yoloy steel to match the **Youngstown Sheet & Tube Company** piping of the same alloy.

Yoloy is a high strength, low alloy steel containing 2 per cent nickel and 1 per cent copper. The "matched metal" pipe, fittings, and flanges will be produced by both companies, with Youngstown producing the pipe and B&W manufacturing the fittings and flanges.

New Southern Personnel Equipment Sales

Royal M. Scott has joined **Lenkurt Electric Co., Inc.,** as a sales engineer assigned to the Southwestern District office located at Suite 1425, Southland Center, Dallas, Texas.

W. C. Mohrman is Houston district sales manager for **Babcock & Wilcox Company's** Tubular Products Division that recently moved to new quarters at 3015 Richmond Ave. The new mailing address is P. O. Box 25127, Houston 6, Texas.

Fostoria Corporation. Fostoria, Ohio, has appointed Whitman & Associates, 313 Bona Allen Bldg., Atlanta, Georgia, as area manager for general products—critical work area lighting and electric infrared comfort heating, in the Southern States.

Hodgson Equipment Co., 1501-7 East 7th St., Tulsa, Okla., has been appointed sales representative for **Cleveland Tramrail** overhead materials handling equipment in Oklahoma and northwest Arkansas. H. A. Hodgson, manager, is a registered Professional Engineer in Mechanical Engineering.

Walter W. Hurst has joined the staff of **Gauggel Engineering Company, Inc.,** P. O. Box 9065, Birmingham 13, Alabama, as sales engineer. The firm specializes in industrial controls and hydraulic pneumatic equipment.

Lem Hightower has been promoted from manager of **Unistrut Steel Service Company** of Atlanta to construction sales supervisor of the Southeast area. Raymond W. Wanner succeeds him as manager for Atlanta, Georgia.

Russell B. Loe is now associated with the **Lewis M. Crowe Company,** P. O. Box 12288, Atlanta 5, Georgia, manufacturers' agents for power equipment, process controls and analytic instrumentation. Mr. Loe has been Southeastern district manager for American Sterilizer Company for the past nine years.

Recent appointments by **Owatonna Tool Company's** Tools & Equipment Division are: Otto L. Hughes, Jr., Alexandria, La., as district manager for Louisiana and northeastern Texas; William T. McCorkle, 6052

Robbins Circle North, Jacksonville, Fla., as district manager for Florida; and Martin M. Shea, 533 Brown Ave., Hagerstown, Md., as district manager for the District of Columbia, Virginia, Maryland and Delaware.

Davidson-Kennedy, Atlanta

Davidson - Kennedy Company, Atlanta, Georgia, designers and manufacturers of machinery for the vege-

table oil mill, fertilizer and textile industries recently named **Homer Hansen** as Sales Manager.

Mr. Hansen, a graduate mechanical engineer, was previously with Combustion Engineering Co.

Pa. Crusher Div.—Texas

The Chavigny Company, 2200 Welch Street, Houston 19, Texas, has been appointed sales representative for the **Pennsylvania Crusher Division** of Bath Iron Works Corporation, West Chester, Pa., for all of Texas, except a few southwestern counties.

The Chavigny Company is headed by Neil L. Chavigny and A. D. Scotty, Jr. Mr. Chavigny was graduated from Tulane University, and Mr. Scotty was graduated from Rice University. Both are chemical engineers and have had broad experience in the process industries.

Lepel—Atlanta

Lepel High Frequency Laboratories, Inc., of New York City, has announced the appointment of Dilcher Engineering Company, 988 Spring St., N.W., Atlanta 9, Georgia, as exclusive representative in the area for sales and service of Lepel induction heating equipment for heat treating, brazing, soldering, melting, zone refining and crystal growing of semiconductor materials.

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G.E. Computer Dept. Atlanta District

Establishment of the Atlanta district sales office for the **General Electric Company's** Computer Department to serve five Southeastern states has been announced.

Wesley A. Swanson is district manager of the new office at 270 Peachtree Street, N.W. The office will serve North Carolina, South Carolina, Alabama, Georgia and Florida.

Baltimore G&E Orders Load-Frequency Controls

Leeds & Northup Company, Philadelphia, manufacturer of industrial controls and measuring instruments, has received a contract from Baltimore Gas & Electric Company for automatic load-frequency controls to facilitate service of electric power to the utility's over one-half million customers. The controls will regulate major generating units at five steam stations and will control 1,197-000 kilowatts of generation for the 6-county, heavily industrialized Baltimore region.

Riley — New Orleans

George K. Reech has been appointed district manager of Riley's New Orleans Office to succeed the late Robert A. Banck.

The New Orleans Office handles the sale of steam generating and fuel burning equipment, designed, manufactured and erected by **Riley Stoker Corporation** and its Union Iron Works Division for public utility and industrial installations.

Mr. Reech was formerly associated with Republic Flow Meters as district manager of the New Orleans Office. He is a graduate of Louisiana Polytechnic Institute BSME, a member of ASME and the New Orleans Engineers Club.

Bethlehem Steel Co. Atlanta District Mgr.

Vincent J. Pazzetti, III was appointed sales manager for **Bethlehem Steel Company's** Atlanta district, effective Oct. 1, 1961. He succeeds James E. McQueen, who retired after 35 years with the company.

Mr. Pazzetti was graduated from Lehigh University in 1937 with a Bachelor of Science degree in business administration. In July of that year he entered the sales department of Bethlehem Steel as a member of the company's Loop Course of management training for college graduates. He was first assigned to general sales, then to pipe sales, becoming division head of pipe sales in 1940.

D. J. Murray—Carolinas

Howard V. Caton Company, 230 North Torrence St., Charlotte, North Carolina, has been appointed distributor of GRID Unit Heaters, Blast Heaters and Radiators, according to an announcement from **D. J. Murray Manufacturing Co.,** Wausau, Wisc., to cover North and South Carolina.

American Air Filter Opens Memphis Office

American Air Filter Company, Inc., Louisville, Kentucky, has opened a new branch office in the Laurelwood Building, 376 Perkins St. Ext., Memphis 17, Tennessee.

Royce V. Matkin has been named branch manager, and has been transferred from the office of D. S. Deem, Tulsa sales representative for AAF. Mr. Matkin is a 1947 graduate in engineering from the University of Texas.

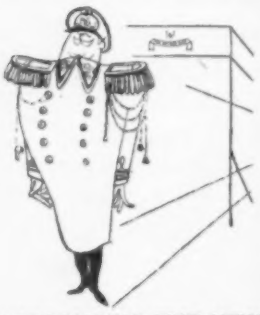
The new sales office will market the firm's air filtration and dust control equipment in the Memphis area and surrounding counties of Tennessee and Arkansas. It will serve customers previously supplied through C. W. Dean and Associates of Memphis.

Tulsa Refinery Installs Computer

TRW Computers Company, a division of **Thompson Ramo Wooldridge Inc.,** has installed an RW-300 computer control system at the Tulsa refinery of **DX Sunray Oil Company** to perform on-line, closed-loop control of a new 85,000 barrel-per-day crude oil distillation unit.

The distillation unit, which replaces five older crude units that had combined capacity of 75,000 barrels per day, is the first major refinery unit to incorporate a computer control system in its original design. It went on stream in mid-September.

The RW-300 provides continuous and automatic control of the huge process by continually scanning 191 process instruments and adjusting 30 controller setpoints to maintain optimum efficiency. Such variables as temperatures, pressures, flow rates, and stream compositions are checked every 10 minutes and their readings are compared with predetermined



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limits stored in the computer's memory. Using this instrument data and a mathematical model of the process, the RW-300 exercises direct control over the distillation unit by automatically adjusting the appropriate controller setpoints.

A-C Distributors

Allis - Chalmers Industries Group recently announced the appointment of Delta Electric Supply, Inc., 622 North Washington, Wichita, Kansas, as distributor of motors, controls, and transformers in several counties in Kansas. Robert J. Holder is president and sales manager of Delta Electric Supply.

At the same time, Interstate Electric Company, Inc., Charles Page Blvd., Sand Springs, Oklahoma, was appointed distributor for A-C distribution transformers in the surrounding counties in Oklahoma. J. W. Graham is president of the concern, and E. F. Stuart is sales manager.

A newly named agency for Allis-Chalmers regulators and capacitors in portions of Tennessee, Mississippi, Arkansas, Missouri, and Kentucky, is the Dixie Electric Sales Company, Memphis, Tenn.

Exide — Southeast

Charles A. Taylor has been named manager of the Southeast Region of The Electric Storage Battery Company's **Exide Industrial Marketing Division,** succeeding J. A. Klingensmith. The region comprises the

Southern coastal states from Virginia to Florida, Western Maryland, the District of Columbia, eastern Tennessee, and Alabama.

A former Washington District manager with Edison Industries, Mr. Taylor has been manager of Exide's Washington District since the consolidation of the Exide and Edison Industries' sales forces last year. He lives in Bethesda, Md.

Name Change—Strong

The Conneaut, Ohio, manufacturing division of Strong, Carlisle & Hammond Co. has changed its name to **Strong.**

Strong, and the McAlear Mfg. Co. of Chicago, comprise the Specialty Valve, Trap & Controls Division of White Sewing Machine Corporation, Cleveland.

Strong products, which are sold through more than 250 outlets in the United States and Canada, include steam traps, control valves, strainers, separators, and blow-down systems.

Feedrail—Florida

Shannon Associates, 1204 East Colonial Drive, Orlando, Florida, has been appointed representative for **Feedrail Corporation** for the portion of Florida east of Jackson, Calhoun and Gulf counties. The company has branches at Oakland Park and St. Petersburg.

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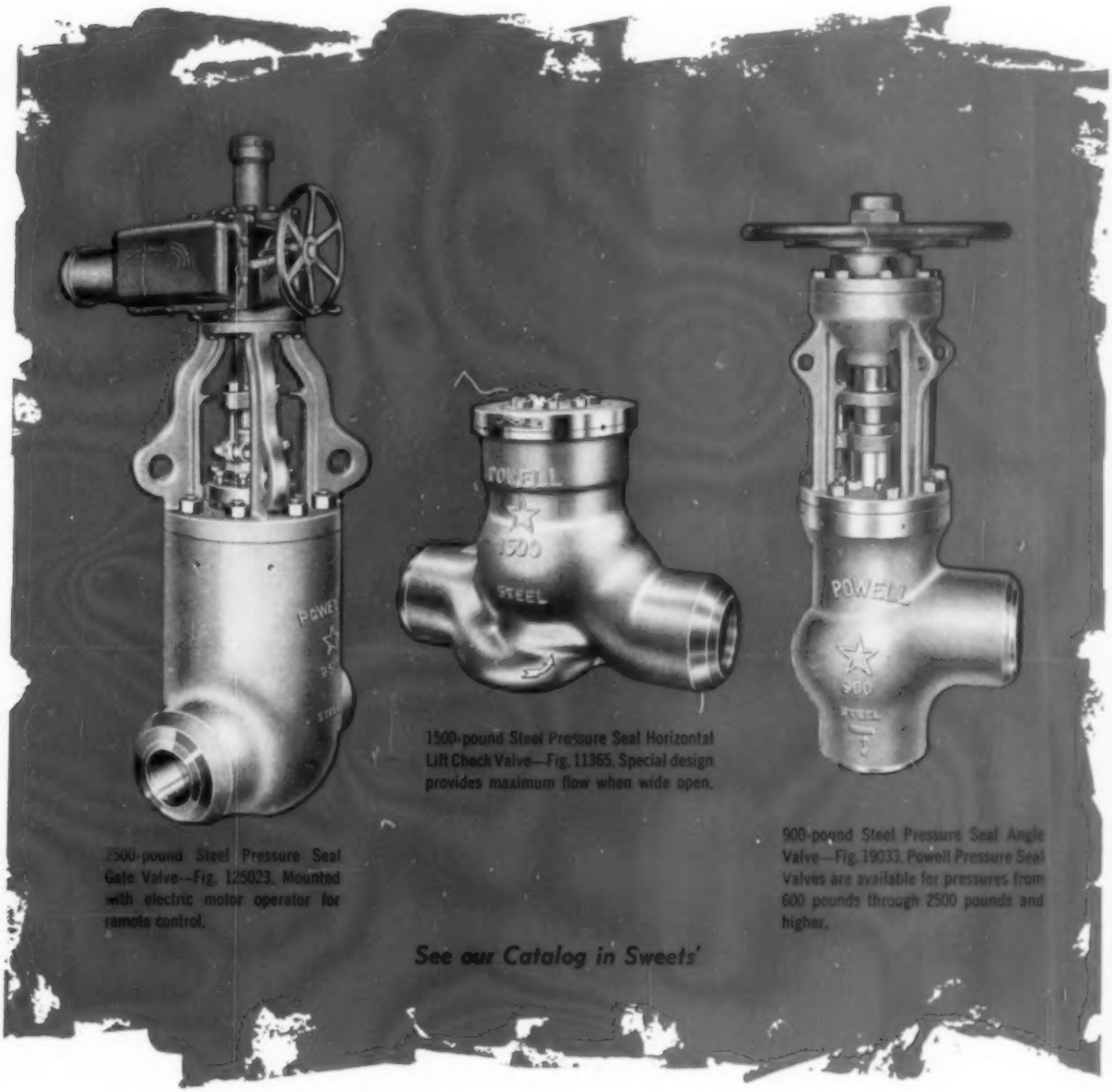

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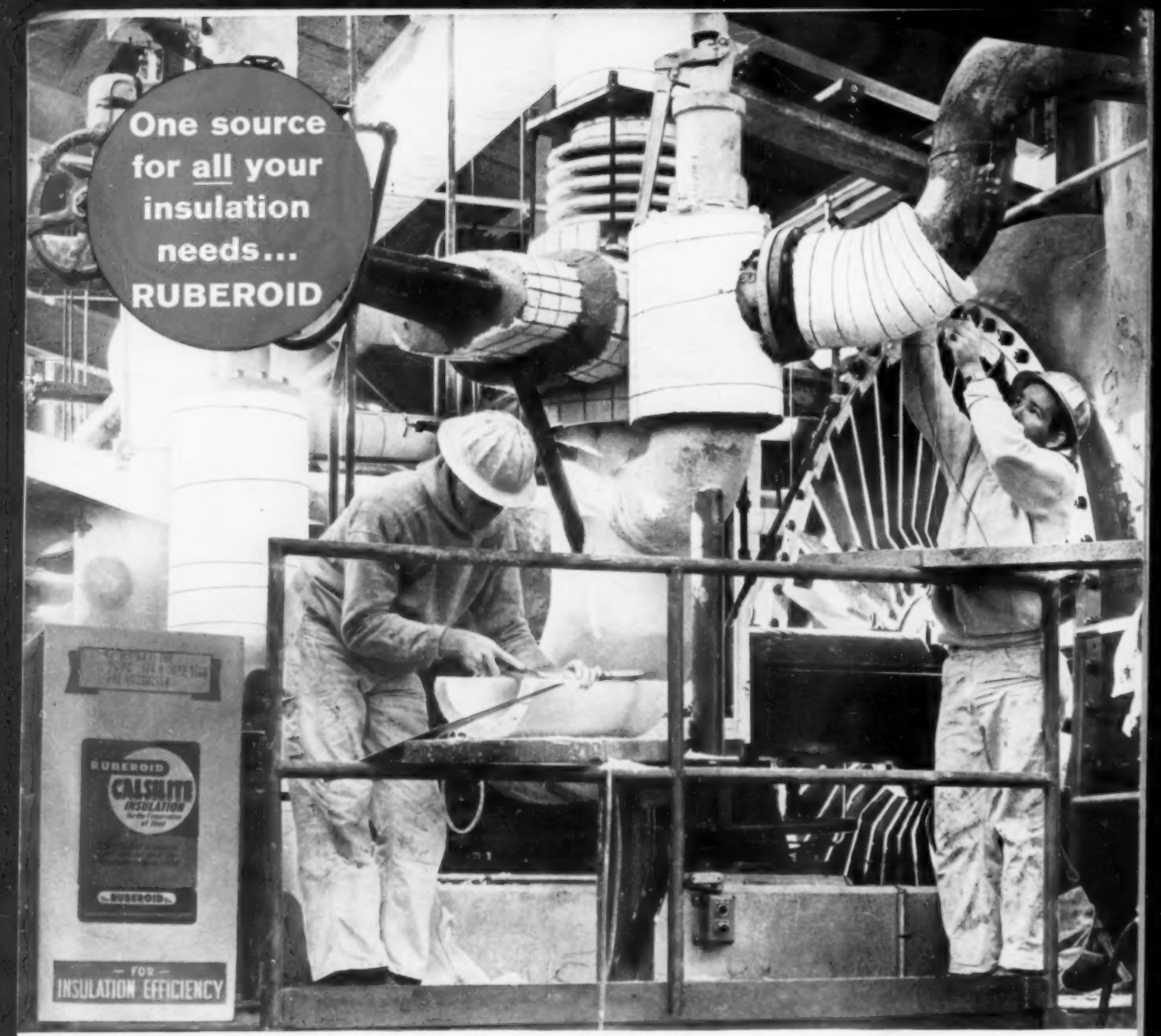

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